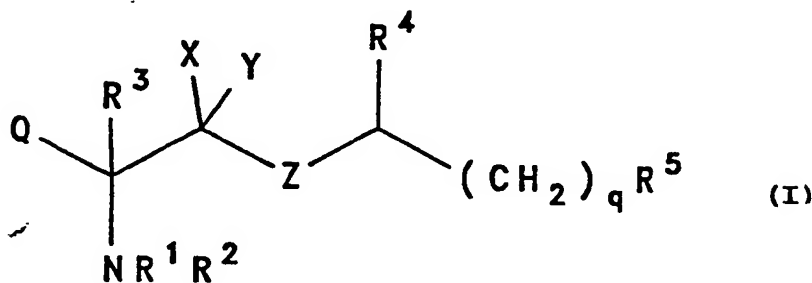




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵: C07D 233/54, 233/76, 249/08 C07D 249/14, 257/04, 271/06 A61K 31/41	A1	(11) International Publication Number: WO 93/24465 (43) International Publication Date: 9 December 1993 (09.12.93)
(21) International Application Number: PCT/GB93/01072 (22) International Filing Date: 25 May 1993 (25.05.93) (30) Priority data: 9211193.9 27 May 1992 (27.05.92) GB (71) Applicant (for all designated States except US): MERCK SHARP & DOHME LIMITED [GB/GB]; Hertford Road, Hoddesdon, Hertfordshire EN11 9BU (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): OWENS, Andrew, Pate [GB/GB]; 77 Dingle Road, Rushden, Northamptonshire NN10 9UE (GB). TEALL, Martin, Richard [GB/GB]; 55 Lower Street, Stansted, Essex CM24 8LN (GB). WILLIAMS, Brian, John [GB/GB]; 73 Godfrey Way, Great Dunmow, Essex CM6 2SE (GB).		(74) Agent: QUILLIN, Helen, Kaye; Merck & Co., Inc., European Patent Department, Terlings Park, Eastwick Road, Harlow, Essex CM20 2QR (GB). (81) Designated States: AU, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>

(54) Title: 2/3-(HETEROCYCLIC ALKYL AMINO)-1-(SUBST.-PHENYL-METHOXY)-ETHANES/PROPANES AS TACHYKININ-RECEPTOR ANTAGONISTS

**(57) Abstract**

Compounds of formula (I), and salts and prodrugs thereof, wherein Q represents phenyl or benzhydryl; X and Y each represent H or X and Y together form a group =O; Z is O, S or NR⁸ (R⁸ is H or C₁₋₆alkyl); R¹ is H, optionally substituted C₁₋₆alkyl, phenyl(C₁₋₄ alkyl), C₂₋₆alkylene, COR^a, COOR^a, CONHR^a, COC₁₋₄alkylNR^aR^b, or CONR^aC₁₋₄alkylCONR^aR^b; R² is C₁₋₄alkyl substituted by an optionally substituted aromatic heterocycle; R³ is H, C₁₋₆alkyl or C₂₋₆alkenyl; R⁴ is H, C₁₋₆alkyl or optionally substituted phenyl; R⁵ represents optionally substituted phenyl; and q is 0, 1, 2 or 3; are tachykinin antagonists useful in therapy.

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2/3-(HETEROCYCLIC ALKYL AMINO)-1-(SUBST.-PHENYL-METHOXY)-
ETHANES/PROPANES AS TACHYKININ-RECEPTOR ANTAGONISTS

5 This invention relates to a class of compounds,
which are useful as tachykinin receptor antagonists.

The tachykinins are a group of naturally-
occurring peptides found widely distributed throughout
mammalian tissues, both within the central nervous system
and in the peripheral nervous and circulatory systems.
10 The structures of three known mammalian tachykinins are
as follows:

Substance P:

Arg-Pro-Lys-Pro-Gln-Gln-Phe-Phe-Gly-Leu-Met-NH₂

Neurokinin A:

15 His-Lys-Thr-Asp-Ser-Phe-Val-Gly-Leu-Met-NH₂

Neurokinin B:

Asp-Met-His-Asp-Phe-Phe-Val-Gly-Leu-Met-NH₂

Evidence for the usefulness of tachykinin
receptor antagonists in pain, headache, especially
20 migraine, Alzheimer's disease, multiple sclerosis,
attenuation of morphine withdrawal, cardiovascular
changes, oedema, such as oedema caused by thermal injury,
chronic inflammatory diseases such as rheumatoid
arthritis, asthma/bronchial hyperreactivity and other
25 respiratory diseases including allergic rhinitis,
inflammatory diseases of the gut including ulcerative
colitis, and Crohn disease, ocular injury and ocular
inflammatory diseases, proliferative vitreoretinopathy,
irritable bowel syndrome and disorders of bladder
30 function including cystitis and bladder detruser hyper-
reflexia is reviewed in "Tachykinin Receptors and
Tachykinin Receptor Antagonists", C.A. Maggi, R.
Patacchini, P. Rovero and A. Giachetti, J. Auton.
Pharmacol. (1993) 13, 23-93. Tachykinin antagonists are

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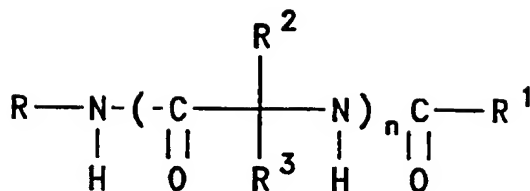
also believed to be useful in allergic conditions [Hamelet et al Can. J. Pharmacol. Physiol. (1988) 66 1361-7], and immunoregulation [Lotz et al Science (1988) 241 1218-21 and Kimball et al, J. Immunol. (1988) 141 (10) 3564-9]. Tachykinin antagonists may also be useful in the treatment of small cell carcinomas, in particular small cell lung cancer (SCLC) [Langdon et al., Cancer Research (1992) 52, 4554-7].

It has furthermore been suggested that tachykinins have utility in the following disorders: depression, dysthymic disorders, chronic obstructive airways disease, hypersensitivity disorders such as poison ivy, vasospastic diseases such as angina and Reynauld's disease, fibrosing and collagen diseases such as scleroderma and eosinophilic fascioliasis, reflex sympathetic dystrophy such as shoulder/hand syndrome, addiction disorders such as alcoholism, stress related somatic disorders, neuropathy, neuralgia, disorders related to immune enhancement or suppression such as systemic lupus erythmatosis (European patent application no. 0 436 334), conjunctivitis, vernal conjunctivitis, contact dermatitis, atropic dermatitis, urticaria, and other eczematoid dermatitis (European patent application no. 0 394 989) and emesis (European patent application no. 0 533 280).

European patent application no. 0 194 464 discloses compounds of formula (A):

30

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(A)

wherein:

10 R^1 is loweralkyl, arylloweralkyl or optionally substituted phenyl;

R^2 is inter alia phenyl;

R^3 is inter alia H or loweralkyl;

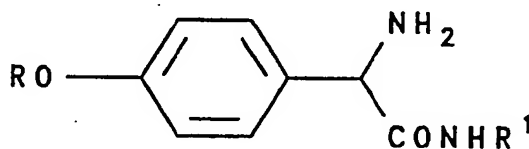
15 R is inter alia arylloweralkyl; and

n is inter alia 1.

The compounds are said to have anticonvulsant properties.

German patent application no. 28 51 435 discloses compounds of formula (B):

20



(B)

wherein:

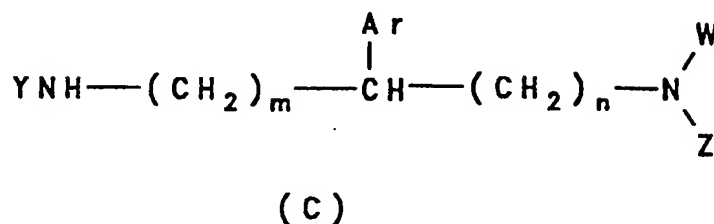
30 R is H or CH_3 ; and

R^1 is inter alia a loweralkyl group substituted by an optionally substituted phenyl group.

The compounds are said to be useful in heart disease, obesity and diabetes.

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Canadian patent application no 2,029,338
discloses compounds of formula (C):



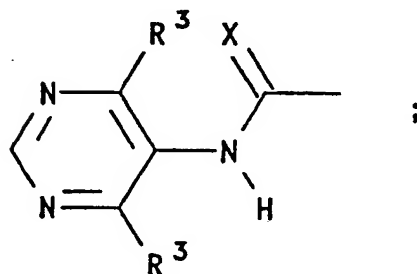
wherein

Ar is inter alia phenyl;

m is inter alia zero;

15

Y is H, Ar'^oNHC, Ar'^sNHC, R-C, RCH₂ or



n is inter alia 1;

25

W is inter alia H or C₁₋₂₀alkyl; and

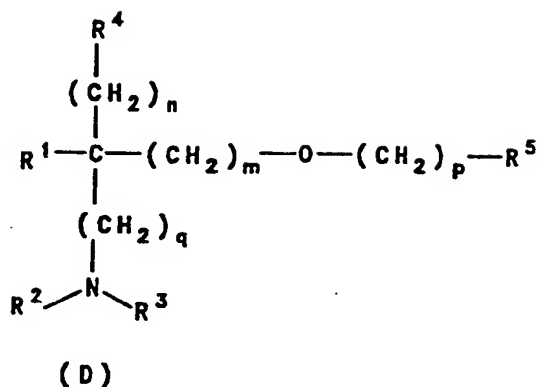
Z is inter alia R-CH₂, where R is inter alia
optionally substituted phenyl.

The compounds are said to be ACAT inhibitors
useful in lowering blood cholesterol levels.

30

British patent application no. 2054588
discloses compounds of formula (D):

- 5 -



wherein

R^1 is C_{1-10} alkyl;

R^2 and R^3 are H or C_{1-10} alkyl;

15 R^4 is inter alia optionally substituted phenyl;

R^5 is inter alia optionally substituted phenyl;

n is inter alia zero;

m is inter alia 1;

20 p is inter alia 1; and

q is inter alia zero.

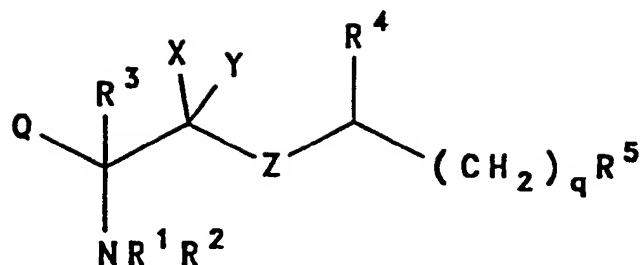
The compounds are said to have anti-spasmodic, anaesthetic and analgesic activity.

There is no prior art disclosure of the amine substitution of the compounds of the present invention.

25 The present invention provides a compound of formula (I), or a salt or prodrug thereof:

30

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(I)

wherein

Q represents optionally substituted phenyl or optionally substituted benzhydryl;

15 X and Y each represent H or X and Y together form a group =O;

Z represents O, S or NR^8 , where R^8 represents H or C_{1-6} alkyl;

20 R^1 represents H, C_{1-6} alkyl optionally substituted by hydroxy, cyano, COR^a , COOR^a , CONR^aR^b , $\text{COC}_{1-4}\text{alkylNR}^a\text{R}^b$, $\text{CONR}^a\text{C}_{1-4}\text{alkylCONR}^a\text{R}^b$ or NR^aR^b , (where R^a and R^b each independently represent H, C_{1-6} alkyl or C_{0-4} alkylphenyl optionally substituted in the phenyl ring by one or more of C_{1-6} alkyl, C_{1-6} alkoxy, halo and trifluoromethyl), phenyl(C_{1-4} alkyl), (optionally
25 substituted by one or more of C_{1-6} alkyl, C_{1-6} alkoxy, halo and trifluoromethyl in the phenyl ring), C_{2-6} alkylene, COR^a , COOR^a , CONHR^a , $\text{COC}_{1-4}\text{alkylNR}^a\text{R}^b$, or $\text{CONR}^a\text{C}_{1-4}\text{alkylCONR}^a\text{R}^b$ where R^a and R^b are as previously defined;

30 R^2 represents C_{1-4} alkyl substituted by an optionally substituted aromatic heterocycle;

R^3 represents H, C_{1-6} alkyl or C_{2-6} alkylenyl;

R^4 represents H, C_{1-6} alkyl or phenyl (optionally substituted by one or more of C_{1-6} alkyl,

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C₂-6alkenyl, C₂-6alkynyl, halo, cyano, nitro, trifluoromethyl, trimethylsilyl, SR^C, SOR^C, SO₂R^C, OR^C, NR^CR^d, NR^CCOR^d, NR^CCOOR^d, COOR^C or CONR^CR^d, where R^C and R^d each independently represent H, C₁-6alkyl, phenyl or trifluoromethyl);

R⁵ represents phenyl optionally substituted by one or more of C₁-6alkyl, C₂-6alkenyl, C₂-6alkynyl, halo, cyano, nitro, trifluoromethyl, trimethylsilyl, SR^C, SOR^C, SO₂R^C, OR^C, NR^CR^d, NR^CCOR^d, NR^CCOOR^d, COOR^C or CONR^CR^d, where R^C and R^d are as above defined; and

q is 0, 1, 2 or 3.

As used herein, the definition of each expression, when it occurs more than once in any structure, is intended to be independent of its definition elsewhere in the same structure.

The alkyl, alkenyl and alkynyl groups referred to with respect to any of the above formulae may represent straight, branched or cyclic groups or combinations thereof. Thus, for example, suitable alkyl groups include methyl, ethyl, n- or iso-propyl, n-, sec-, iso- or tert-butyl, cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl, and cycloalkyl-alkyl groups such as cyclopropylmethyl; suitable alkenyl groups include vinyl and allyl; and suitable alkynyl groups include propargyl.

The term "halo" as used herein includes fluoro, chloro, bromo and iodo, especially chloro and fluoro.

Where Q represents substituted phenyl or benzhydryl, suitable substituents include C₁-6alkyl, C₂-6alkenyl, C₂-6alkynyl, halo, cyano, nitro, trifluoromethyl, trimethylsilyl, SR^C, SOR^C, SO₂R^C, OR^C, NR^CR^d, NR^CCOR^d, NR^CCOOR^d, COOR^C or CONR^CR^d, where R^C and R^d are as above defined. One or more substituents may be present and each may be located at any available ring position.

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Preferably Q is unsubstituted phenyl or unsubstituted benzhydryl.

Preferably X and Y each represents H.

Preferably Z represents O.

5 Suitable values for the group R^1 include H, C_{1-6} alkyl, especially methyl, ethyl, propyl, and cyclopropylmethyl, C_{1-6} alkyl substituted by, for example, cyano, hydroxy, NH_2 , CO_2 , C_{1-6} alkyl, $CONH_2$ and $CONR^aCH_2CONR^aR^b$, especially $CONHCH_2CONH_2$,
10 $COC_{1-4}alkylNR^aR^b$, especially $COCH_2NR^aR^b$, such as $COCH_2NH_2$ and C_{1-6} alkenyl, especially allyl and formyl. Preferably R^1 is H or C_{1-6} alkyl, such as C_{1-4} alkyl, for example methyl, ethyl or n-propyl.

15 When R^2 represents C_{1-4} alkyl substituted by a substituted aromatic heterocycle, suitable substituents in the heterocyclic ring include one or more of C_{1-6} alkyl, C_{1-6} alkoxy, phenyl, oxo, thioxo, halo, trifluoromethyl, NR^cR^d , NR^cCOR^d , $CONR^cR^d$, C_2R^c , SR^c , SO_2R^c and CH_2OR^c where R^c and R^d are as previously
20 defined. Preferred substituents include methyl, oxo, thioxo and amino. Particularly preferred substituents are oxo and NH_2 .

25 Suitable values for the heteroaromatic moiety of R^2 include thienyl, furyl, pyrrolyl, pyridyl, pyrazolyl, triazolyl, tetrazolyl, thiazolyl, pyrazinyl, pyrimidinyl, pyridazinyl, triazinyl, oxazolyl, oxadiazolyl, thiadiazolyl, isoxazolyl, quinolyl, isothiazolyl, imidazolyl, benzimidazolyl, benzoxazolyl, benzothiophenyl, benzofuranyl and indolyl, any of which
30 may be substituted.

Preferably the heterocyclic moiety of R^2 represents a substituted or unsubstituted 5- or 6-membered nitrogen containing aromatic heterocycle such as for example oxazolyl, oxadiazolyl, tetrazolyl, thiazolyl,

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thiadiazolyl, triazolyl, pyrazinyl, pyridyl, pyrimidinyl, pyridazinyl, imidazolyl or triazinyl. More preferably the heterocyclic moiety of R^2 represents optionally substituted oxadiazolyl, imidazolyl, triazolyl, or
5 tetrazolyl.

Particularly preferred are compounds according to the invention wherein the heterocyclic moiety of R^2 represents 5-(3-aminooxadiazolyl), unsubstituted triazolyl or triazolyl substituted by oxo or thioxo.

10 It will be appreciated that, when the heterocyclic moiety of R^2 is substituted by an oxo or thioxo substituent, different tautomeric forms are possible so that the substituent may be represented as =O or -OH, or =S or -SH, respectively. For the avoidance of
15 doubt, all such tautomeric forms are embraced by the present invention.

Suitable values for the C_{1-4} alkyl moiety of R^2 include CH_2 , $CH(CH_3)$ and CH_2CH_2 . Preferably the C_{1-4} alkyl moiety of R^2 is CH_2 or $CH(CH_3)$, more preferably
20 $CH(CH_3)$.

Suitable values for the group R^3 include H and methyl, preferably H.

Preferably R^4 represents H or C_{1-4} alkyl, especially methyl.

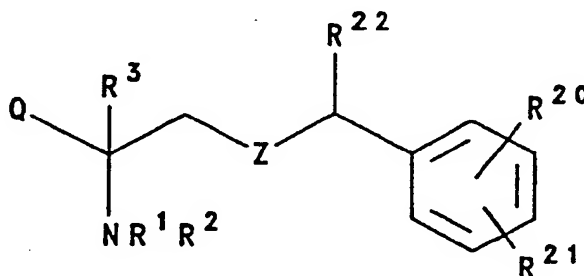
25 Suitably q is zero, 1 or 2, preferably zero.

Preferably R^5 represents substituted phenyl. Suitable phenyl substituents include C_{1-6} alkyl such as methyl, ethyl, i-propyl, i-butyl, t-butyl and cyclopropyl, C_{2-6} alkenyl such as vinyl, C_{1-6} alkoxy such
30 as methoxy, ethoxy and i-propoxy, phenoxy, amino, carboxamido, carbonylmethoxy, trimethylsilyl, nitro, cyano, bromo, chloro, fluoro, iodo and trifluoromethyl. Preferably R^5 represents phenyl substituted by one or more groups selected from C_{1-4} alkyl, such as methyl and

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t-butyl, trifluoromethyl and halo such as bromo, chloro, fluoro and iodo. Preferably R^5 represents 3,5-disubstituted phenyl. A particularly preferred value for R^5 is 3,5-bistrifluoromethylphenyl.

5 A preferred sub-group of compounds according to the invention is represented by formula (Ia)



(Ia)

wherein Q, R^1 , R^2 , R^3 and Z are as defined for formula (I) above;

R^{20} and R^{21} each independently represent H, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, halo, cyano, nitro, 20 trifluoromethyl, trimethylsilyl, SR^C , SOR^C , SO_2R^C , OR^C , $NR^C R^d$, $NR^C COR^d$, $NR^C COOR^d$, $COOR^C$ or $CONR^C R^d$, where R^C and R^d are as above defined;

R^{22} represents H or methyl;
and salts and prodrugs thereof.

25 Particularly preferred are compounds of formula (Ia) wherein R^{20} and R^{21} are other than H and are located in the 3- and 5-positions. Most preferably R^{20} and R^{21} each represent C_{1-4} alkyl, halo or trifluoromethyl.

30 For use in medicine, the salts of the compounds of formula (I) will be pharmaceutically acceptable salts. Other salts may, however, be useful in the preparation of the compounds according to the invention or of their pharmaceutically acceptable salts. Suitable pharmaceutically acceptable salts of the compounds of

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this invention include acid addition salts which may, for example, be formed by mixing a solution of the compound according to the invention with a solution of a pharmaceutically acceptable non-toxic acid such as hydrochloric acid, sulphuric acid, oxalic acid, fumaric acid, p-toluenesulphonic acid, maleic acid, succinic acid, acetic acid, citric acid, tartaric acid, carbonic acid or phosphoric acid. Salts of amine groups may also comprise quaternary ammonium salts in which the amino nitrogen atom carries a suitable organic group such as an alkyl, alkenyl, alkynyl or aralkyl moiety. Thus, for example, when R^1 is other than H, the nitrogen atom to which it is attached may be further substituted to give a quaternary ammonium salt. Furthermore, where the compounds of the invention carry an acidic moiety, suitable pharmaceutically acceptable salts thereof may include metal salts such as alkali metal salts, e.g. sodium or potassium salts; and alkaline earth metal salts, e.g. calcium or magnesium salts.

The present invention includes within its scope prodrugs of the compounds of formula (I) above. In general, such prodrugs will be functional derivatives of the compounds of formula (I) which are readily convertible in vivo into the required compound of formula (I). Conventional procedures for the selection and preparation of suitable prodrug derivatives are described, for example, in "Design of Prodrugs", ed. H. Bundgaard, Elsevier, 1985.

The compounds according to the invention may exist both as enantiomers and as diastereomers. It is to be understood that all such isomers and mixtures thereof are encompassed within the scope of the present invention.

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The substance P antagonising activity of the compounds described herein was evaluated using the human NK1R assay described in published European patent application no. 0 528 495. The method essentially
5 involves determining the concentration of the test compound required to reduce by 50% the amount of radiolabelled substance P binding to human NK1R, thereby affording an IC₅₀ value for the test compound. The compounds of Examples 1-10, for example, were found to
10 have IC₅₀ values less than 100nM.

The invention also provides pharmaceutical compositions comprising one or more compounds of this invention in association with a pharmaceutically acceptable carrier. Preferably these compositions are in
15 unit dosage forms such as tablets, pills, capsules, powders, granules, solutions or suspensions, or suppositories, for oral, parenteral or rectal administration, or topical administration including administration by inhalation or insufflation.

The invention further provides a process for the preparation of a pharmaceutical composition comprising a compound of formula (I), or a salt or prodrug thereof, and a pharmaceutically acceptable carrier, which process comprises bringing a compound of
20 formula (I), or a salt or prodrug thereof into association with a pharmaceutically acceptable carrier.

For preparing solid compositions such as tablets, the principal active ingredient is mixed with a pharmaceutical carrier, e.g. conventional tableting
30 ingredients such as corn starch, lactose, sucrose, sorbitol, talc, stearic acid, magnesium stearate, dicalcium phosphate or gums, and other pharmaceutical diluents, e.g. water, to form a solid preformulation composition containing a homogeneous

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mixture of a compound of the present invention, or a non-toxic pharmaceutically acceptable salt thereof. When referring to these preformulation compositions as homogeneous, it is meant that the active ingredient is dispersed evenly throughout the composition so that the composition may be readily subdivided into equally effective unit dosage forms such as tablets, pills and capsules. This solid preformulation composition is then subdivided into unit dosage forms of the type described above containing from 0.1 to about 500 mg of the active ingredient of the present invention. The tablets or pills of the novel composition can be coated or otherwise compounded to provide a dosage form affording the advantage of prolonged action. For example, the tablet or pill can comprise an inner dosage and an outer dosage component, the latter being in the form of an envelope over the former. The two components can be separated by an enteric layer which serves to resist disintegration in the stomach and permits the inner component to pass intact into the duodenum or to be delayed in release. A variety of materials can be used for such enteric layers or coatings, such materials including a number of polymeric acids and mixtures of polymeric acids with such materials as shellac, cetyl alcohol and cellulose acetate.

The liquid forms in which the novel compositions of the present invention may be incorporated for administration orally or by injection include aqueous solutions, suitably flavoured syrups, aqueous or oil suspensions, and flavoured emulsions with edible oils such as cottonseed oil, sesame oil, coconut oil or peanut oil, as well as elixirs and similar pharmaceutical vehicles. Suitable dispersing or suspending agents for aqueous suspensions include synthetic and natural gums

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such as tragacanth, acacia, alginate, dextran, sodium carboxymethylcellulose, methylcellulose, polyvinylpyrrolidone or gelatin.

5 Compositions for inhalation or insufflation
include solutions and suspensions in pharmaceutically
acceptable, aqueous or organic solvents, or mixtures
thereof, and powders. The liquid or solid compositions
may contain suitable pharmaceutically acceptable
excipients as set out above. Preferably the compositions
10 are administered by the oral or nasal respiratory route
for local or systemic effect. Compositions in preferably
sterile pharmaceutically acceptable solvents may be
nebulised by use of inert gases. Nebulised solutions may
be breathed directly from the nebulising device or the
15 nebulising device may be attached to a face mask, tent or
intermittent positive pressure breathing machine.
Solution, suspension or powder compositions may be
administered, preferably orally or nasally, from devices
which deliver the formulation in an appropriate manner.

20 For topical administration, for example as a
cream, ointment or lotion, pharmaceutically acceptable
carriers are, for example, water, mixtures of water and
water-miscible solvents such as lower alkanols or
arylalkanols, vegetable oils, polyalkylene glycols,
25 petroleum based jelly, ethyl cellulose, ethyl oleate,
carboxymethylcellulose, polyvinylpyrrolidone, isopropyl
myristate and other conventionally-employed non-toxic,
pharmaceutically acceptable organic and inorganic
carriers. The pharmaceutical preparation may also
30 contain non-toxic auxiliary substances such as
emulsifying, preserving, wetting agents, bodying agents
and the like, as for example, polyethylene glycols 200,
300, 400 and 600, carbowaxes 1,000, 1,500, 4,000, 6,000
and 10,000, antibacterial components such as quaternary

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ammonium compounds, phenylmercuric salts known to have cold sterilizing properties and which are non-injurious in use, thimerosal, methyl and propyl paraben, benzyl alcohol, phenyl ethanol, buffering ingredients such as sodium chloride, sodium borate, sodium acetates, gluconate buffers, and other conventional ingredients such as sorbitan monolaurate, triethanolamine, oleate, polyoxyethylene sorbitan monopalmitate, dioctyl sodium sulfosuccinate, monothioglycerol, thiosorbitol, ethylenediamine tetraacetic acid, and the like.

The compounds of formula (I) are of value in the treatment of a wide variety of clinical conditions which are characterised by the presence of an excess of tachykinin, in particular substance P, activity. These may include disorders of the central nervous system such as anxiety, depression, psychosis and schizophrenia; neurodegenerative disorders such as dementia, including senile dementia of the Alzheimer type, Alzheimer's disease and Down's syndrome; demyelinating diseases such as multiple sclerosis (MS) and amyotrophic lateral sclerosis (ALS; Lou Gehrig's disease) and other neuropathological disorders such as peripheral neuropathy, for example, diabetic or chemotherapy-induced neuropathy, and postherpetic and other neuralgias; small cell carcinoma such as small cell lung cancer; respiratory diseases such as chronic obstructive airways disease, bronchopneumonia, bronchospasm and asthma; inflammatory diseases such as inflammatory bowel disease, irritable bowel syndrome, psoriasis, fibrositis, osteoarthritis and rheumatoid arthritis; allergies such as eczema and rhinitis; hypersensitivity disorders such as poison ivy; ophthalmic diseases such as conjunctivitis, vernal conjunctivitis, and the like, and proliferative vitreoretinopathy; cutaneous diseases such

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as contact dermatitis, atropic dermatitis, urticaria, and other eczematoïd dermatitis; oedema, such as oedema caused by thermal injury; addiction disorders such as alcoholism; stress related somatic disorders; reflex
5 sympathetic dystrophy such as shoulder/hand syndrome; dysthymic disorders; adverse immunological reactions such as rejection of transplanted tissues and disorders related to immune enhancement or suppression such as systemic lupus erythematosus; gastrointestinal (GI)
10 disorders and diseases of the GI tract such as disorders associated with the neuronal control of viscera such as ulcerative colitis, Crohn's disease and incontinence; emesis, including acute, delayed and anticipatory emesis, for example, induced by chemotherapy, radiation, toxins,
15 pregnancy, vestibular disorders, surgery, migraine and variations in intercranial pressure; disorders of bladder function such as cystitis and bladder detrusor hyper-reflexia; fibrosing and collagen diseases such as scleroderma and eosinophilic fascioliasis; disorders of
20 blood flow caused by vasodilation and vasospastic diseases such as angina, migraine and Reynaud's disease; and pain or nociception, for example, that attributable to or associated with any of the foregoing conditions, especially the transmission of pain in migraine.

25 The compounds of formula (I) are particularly useful in the treatment of pain or nociception and/or inflammation and disorders associated therewith such as, for example, neuropathy, such as diabetic and chemotherapy-induced neuropathy, postherpetic and other
30 neuralgias, asthma, osteoarthritis, rheumatoid arthritis and especially migraine.

 The present invention further provides a compound of formula (I) for use in therapy.

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According to a further or alternative aspect, the present invention provides a compound of formula (I) for use in the manufacture of a medicament for the treatment of physiological disorders associated with an excess of tachykinins, especially substance P.

The present invention also provides a method for the treatment or prevention of physiological disorders associated with an excess of tachykinins, especially substance P, which method comprises administration to a patient in need thereof of a tachykinin reducing amount of a compound of formula (I) or a composition comprising a compound of formula (I).

For the treatment of certain conditions it may be desirable to employ a compound according to the present invention in conjunction with another pharmacologically active agent. For example, for the treatment of respiratory diseases such as asthma, a compound of formula (I) may be used in conjunction with a bronchodilator, such as a β_2 -adrenergic receptor antagonist or tachykinin antagonist which acts at NK-2 receptors. The compound of formula (I) and the bronchodilator may be administered to a patient simultaneously, sequentially or in combination.

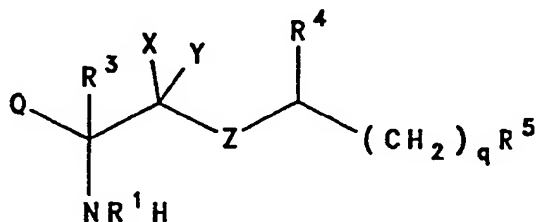
The present invention accordingly provides a method for the treatment of a respiratory disease, such as asthma, which method comprises administration to a patient in need thereof of an effective amount of a compound of formula (I) and an effective amount of a bronchodilator.

The present invention also provides a composition comprising a compound of formula (I), a bronchodilator, and a pharmaceutically acceptable carrier.

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In the treatment of the conditions associated with an excess of tachykinins, a suitable dosage level is about 0.001 to 50 mg/kg per day, in particular about 0.01 to about 25 mg/kg, such as from about 0.05 to about 10 mg/kg of a compound of formula (I) per day. For example, in the treatment of conditions involving the neurotransmission of pain sensations, a suitable dosage level is about 0.001 to 25 mg/kg per day, preferably about 0.005 to 10 mg/kg per day, and especially about 0.005 to 5 mg/kg per day. The compounds may be administered on a regimen of 1 to 4 times per day, preferably once or twice per day.

According to one general process (A), the compounds according to the invention may be prepared by reaction of a compound of formula (II)



(II)

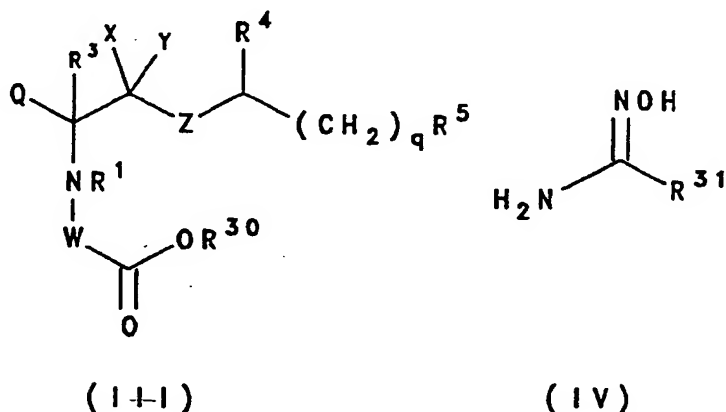
wherein Q, R¹, R³, R⁴, R⁵, q, X, Y and Z are as defined for formula (I), with a reagent suitable to introduce the group R², for example, a halide of formula R²-Hal, where Hal represents halo, such as chloro, bromo or iodo, in the presence of a base.

Suitable bases of use in the reaction include inorganic bases such as alkali metal carbonates, for example, potassium carbonate.

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Conveniently the reaction is effected in a suitable organic solvent, such as an amide, for example, dimethyl formamide.

According to a second process (B) compounds of formula (I) wherein R^2 represents C_{1-4} alkyl substituted by optionally substituted 5-oxadiazolyl may be prepared by reaction of a compound of formula (III) with a compound of formula (IV):



wherein Q, R^1 , R^3 , R^4 , R^5 , q, X, Y and Z are as defined for formula (I), W represents C_{1-4} alkylidene, R^{30} represents an alkyl group and R^{31} represents H, C_{1-6} alkyl, C_{1-6} alkoxy, halo, $NR^C R^d$ or $NR^C COR^d$, where R^C and R^d are as previously defined, in the presence of a base.

Suitable bases of use in the reaction include alkali metals, such as, for example, sodium, and alkali metal hydrides, such as, for example, sodium hydride.

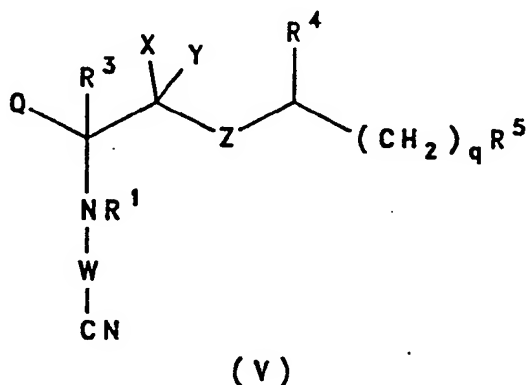
The reaction is conveniently effected in a suitable organic solvent. Which solvents will be appropriate will depend on the nature of the base used. For example, where the base used is an alkali metal, suitable solvents will include alcohols, for example, ethanol, whereas where the base used is an alkali

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hydride, suitable solvents will include ethers, for example, tetrahydrofuran.

Preferably the reaction is conducted at elevated temperature, such as the reflux temperature of the chosen solvent.

According to a further process, (C), compounds of formula (I) wherein the heterocyclic moiety of R^2 represents tetrazolyl may be prepared from intermediates of formula (V):

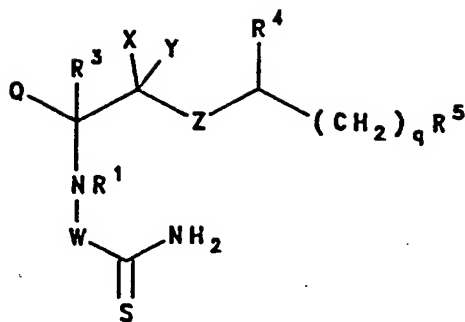


wherein Q, R^1 , R^3 , R^4 , R^5 , q, X, Y, W and Z are as defined for formula (III) by treatment with an alkali metal azide, such as sodium azide.

The reaction is conveniently effected in a high boiling organic solvent, such as, for example, N-methylpyrrolidinone.

According to a further process, (D), compounds of formula (I) wherein the heteroaromatic moiety of R^2 represents thiazolyl may be prepared from intermediates of formula (VI):

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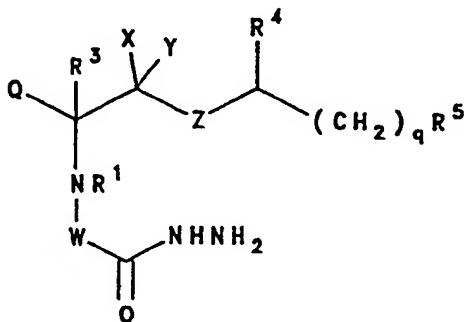


(VI)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III), by reaction with a compound of formula Hal-CH₂C(O)-R⁶⁰, where Hal represents halo, such as bromo, chloro or iodo, and R⁶⁰ represents H or a
 15 suitable substituent such as C₁₋₆alkyl.

The reaction is conveniently effected in a suitable organic solvent, such as a ketone, for example, acetone, or an alcohol, for example, methanol, or a mixture of solvents, preferably at elevated temperature, such as the reflux temperature of the chosen solvent.
 20

According to a further process, (E), compounds of formula (I) wherein the heteroaromatic moiety of R² represents thioxotriazolyl may be prepared from intermediates of formula (VII)
 25



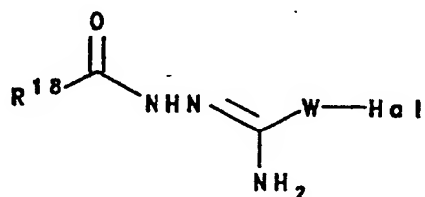
(VII)

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wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III), by reaction with a compound of formula R⁶¹NCS, wherein R⁶¹ represents H or a suitable substituent such as C₁₋₆alkyl, in the presence of a base.

Suitable bases of use in the reaction include organic bases such as, for example, 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU). The reaction is conveniently effected in a suitable organic solvent, such as alcohol, e.g. butanol.

According to a further process, (F), compounds of formula (I) wherein the heteroaromatic moiety of R² represents unsubstituted or substituted triazolyl may be prepared by reaction of intermediates of formula (II) with a compound of formula (VIII):



(VIII)

wherein W and Hal are as previously defined and R¹⁸ is H or a group suitable as a substituent of the triazole ring, or convertible to such a group under the reaction conditions, in the presence of a base.

Suitable bases of use in the reaction include alkali metal carbonates, such as, for example, potassium carbonate.

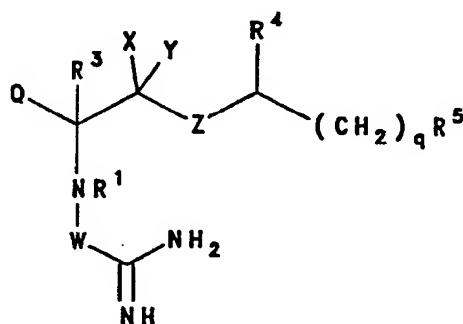
Suitably R¹⁸ represents H, OCH₃ (which is converted to an oxo substituent under the reaction conditions) or CONH₂.

The reaction is conveniently effected in an anhydrous organic solvent, such as, for example,

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anhydrous dimethylformamide, preferably at elevated temperature, such as about 140°C.

According to a further process, (G), compounds of formula (I) wherein the heteroaromatic moiety of R² represents substituted or unsubstituted 1,3,5-triazine may be prepared by reaction of intermediates of formula (IX):



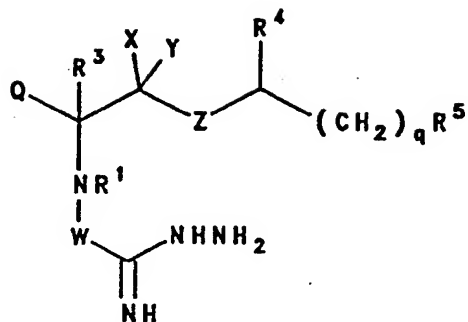
(IX)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III), with substituted or unsubstituted 1,3,5-triazine.

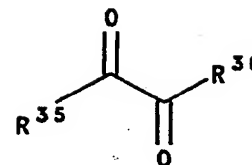
The reaction is conveniently effected in a suitable organic solvent, such as acetonitrile, at elevated temperature, such as 80-90°C, preferably about 82°C.

According to a further process, (H), compounds of formula (I) wherein the heteroaromatic moiety of R² represents substituted or unsubstituted 1,2,5-triazine may be prepared by reaction of an intermediate of formula (X) with a dicarbonyl compound of formula (XI):

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(X)



(XI)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III) and R³⁵ and R³⁶ each independently represent H or a suitable substituent such as C₁₋₆alkyl, e.g. methyl.

15 The reaction is conveniently effected in a suitable organic solvent, such as an ether, e.g. tetrahydrofuran, conveniently at ambient temperature.

 Further details of suitable procedures will be found in the accompanying Examples.

20 Compounds of formula (I) may also be prepared from other compounds of formula (I) using suitable interconversion procedures. Suitable interconversion procedures are described in the accompanying Examples, or will be readily apparent to those skilled in the art.

25 Intermediates of formula (II) may be prepared as described in published International patent applications nos. 93/01160 and 93/01165.

 Intermediates of formula (III) may be prepared from intermediates of formula (II) by reaction with a compound of formula HalWCO₂R³⁰, where Hal represents halo such as chloro, bromo or iodo and W and R³⁰ are as above defined, in the presence of a base. Suitable bases include tertiary amines, for example, triethylamine. Conveniently the reaction is effected in a suitable

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organic solvent, such as an ether, for example, tetrahydrofuran, at elevated temperature, such as the reflux temperature of the solvent.

5 Intermediates of formula (IV) are commercially available or may be prepared from commercially available materials by conventional procedures well-known to those skilled in the art.

10 Intermediates of formula (V) may be prepared from intermediates of formula (II) by reaction with a compound of formula Hal-W-CN, wherein Hal is halo such as bromo, chloro or iodo and W is as previously defined.

Intermediates of formula (VI) may be prepared from intermediates of formula (V) by treatment with an alkylthioamide, such as, for example, thioacetamide.

15 Intermediates of formula (VII) may be prepared from intermediates of formula (III) by treatment with hydrazine. The reaction is conveniently effected in a suitable organic solvent, such as an alcohol, for example, ethanol, at elevated temperature.

20 Compounds of formula (VIII) may be prepared as described in J. Med. Chem., 27, (1984), 849.

Intermediates of formula (IX) may be prepared from intermediates of formula (II) by reaction with a compound of formula Hal-W-C(NH)NH₂, where Hal and W are
25 as previously defined.

Intermediates of formula (X) may be prepared from intermediates of formula (II) by reaction with a compound of formula Hal-W-C(NH)NHNH-Boc, wherein Hal and W are as previously defined and Boc stands for
30 t-butoxycarbonyl, followed by deprotection under acidic conditions.

Compounds of formula (XI) are commercially available or may be prepared from commercially available compounds by known methods.

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Where the above-described process for the preparation of the compounds according to the invention gives rise to mixtures of stereoisomers these isomers may, if desired, be separated, suitably by conventional techniques such as preparative chromatography.

The novel compounds may be prepared in racemic form, or individual enantiomers may be prepared either by enantiospecific synthesis or by resolution. The novel compounds may, for example, be resolved into their component enantiomers by standard techniques, such as the formation of diastereomeric pairs by salt formation with an optically active acid, such as (-)-di-p-toluoyl-d-tartaric acid and/or (+)-di-p-toluoyl-l-tartaric acid followed by fractional crystallization and regeneration of the free base. The novel compounds may also be resolved by formation of diastereomeric esters or amides, followed by chromatographic separation and removal of the chiral auxiliary.

During any of the above synthetic sequences it may be necessary and/or desirable to protect sensitive or reactive groups on any of the molecules concerned. This may be achieved by means of conventional protecting groups, such as those described in Protective Groups in Organic Chemistry, ed. J.F.W. McOmie, Plenum Press, 1973; and T.W. Greene and P.G.M. Wuts, Protective Groups in Organic Synthesis, John Wiley & Sons, 1991. The protecting groups may be removed at a convenient subsequent stage using methods known from the art.

The following Examples illustrate the preparation of compounds according to the invention.

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EXAMPLE 1: ((3-Amino-1,2,4-oxadiazol-5-yl) methyl ammonium)-1-((3'5'-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylpropane-bis oxalate salt

5 a) To a solution of diphenylmethylenimineacetonitrile (44g), benzyltrimethyl ammonium chloride (4.4g) and sodium hydroxide (48.4g) in toluene (40ml) and water (90ml) was added bromodiphenylmethane (149g) at 0°C. After the solution had been stirred at room temperature for 5h a mixture of water (200ml), ethyl acetate (40ml) and hexane (160ml) was added. 10 The solution was filtered and the residue washed with ethyl acetate/hexane and dried *in vacuo* to give 3,3-diphenyl-2-(diphenylmethylenimine)propionitrile 47.6g. ¹H NMR (360MHz, CDCl₃) δ 7.5-6.87 (20H, m, aryl), 4.8 (1H, d, J = 8.85Hz), 4.69 (1H, d, J = 9.2Hz). An analytical sample was 15 recrystallised from ethyl acetate/hexane mp = 152-153°C.

b) 3,3-Diphenyl-2-(diphenylmethylenimine)propionitrile (Example 1a, 46.7g) was heated in a solution of 5.5M-hydrochloric acid (200ml) at reflux for 48h. The solid which crystallised from the cooled solution was removed by 20 filtration, washed with diethyl ether and dried to give β,β-diphenylalanine hydrochloride 21g. ¹H NMR (250MHz, DMSO d₆) δ 8.6 (3H, vbs), 7.6-7.1 (10H, m), 4.8 (1H, d, J = 10.4Hz), 4.4 (1H, d, J = 10.4Hz).

25 c) To a solution of 1M-lithium aluminium hydride in diethyl ether (40ml) was added β,β-diphenylalanine hydrochloride (3.70g, Example 1b) over a period of 1h. The solution was heated at reflux for 1h, cooled to room temperature and to the solution was cautiously added 2M-sodium hydroxide (40ml). After 30 filtering the solution through Celite, the residue was washed with ethyl acetate and the organic phase of the combined filtrates was washed with water, saturated brine and dried (MgSO₄). The

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solid which formed on removal of the solvent *in vacuo* was washed with hexane to give 2-amino-3,3-diphenylpropan-1-ol 2.52g, mp 107-8°C. ¹H NMR (360MHz, CDCl₃) δ 7.36-7.14 (10H, m), 3.79 (1H, d, J = 10.5Hz), 3.6 (1H, m), 3.57 (1H, dd, J = 10.7Hz and 3.3Hz), 3.31 (1H, dd, J = 10.7Hz and 6.7Hz), m/z (CI⁺) 228 (M+H).

d) A solution of 2-amino-3,3-diphenylpropan-1-ol (2.3g, Example 1c) and di-t-butylidicarbonate (2.65g) in dichloromethane (25ml) was stirred at room temperature for 1h. The solid which formed on removal of the solvent was recrystallized from diethyl ether to give 2-t-butoxycarbonylamino-3,3-diphenylpropan-1-ol (2.85g, mp 95-96°C. ¹H NMR (250MHz, CDCl₃) δ 7.34-7.15 (10H, m), 4.58 (1H, bd), 4.48 (1H, m), 4.1 (1H, d, J = 10.6Hz), 3.67 (1H, dd, J = 11.13Hz and 3.11Hz), 3.5 (1H, dd, J = 11.3Hz and 4.45Hz), 1.31 (9H, s).

e) To a cooled solution (0°C) of 2-t-butoxycarbonylamino-3,3-diphenylpropan-1-ol (2.04g, Example 1d) in tetrahydrofuran (50ml) and dimethylformamide (10ml) was added sodium hydride (0.187g, 80% suspension in oil) over 15 minutes. After an additional 10 minutes 3,5-bis(trifluoromethyl)benzyl bromide (1.14ml) was added and the solution stirred at room temperature for 16h. The solvent was removed *in vacuo* and the residue partitioned between CH₂Cl₂ and water. After washing the organic phase with saturated brine and drying (MgSO₄), the solvent was removed *in vacuo* and the residue chromatographed on silica gel in ethyl acetate/hexane (0:100 to 50:50) to give 2-t-butoxycarbonylamino-1-((3',5'-bis(trifluoromethyl)phenyl)methoxy)3,3-diphenylpropane, 2.92g.

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f) A solution of 2-t-butoxycarbonylamino-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylpropane (2.92g, Example 1e) in trifluoroacetic acid (20ml) was evaporated after 10 minutes. A solution of the residue in CH_2Cl_2 was washed with 10% aqueous Na_2CO_3 , water, saturated brine and dried (MgSO_4). Removal of the solvent *in vacuo* gave 2-amino-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylpropane.

g) To a solution of 2-amino-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylpropane (5.0g, Example 1f) and anhydrous K_2CO_3 (2.3g) in dimethylformamide (30ml) was added methyl bromoacetate (1.2ml). The solution was heated to 70°C for 2 hours, cooled to ambient temperature and diluted by addition of water (200ml) and ethyl acetate (200ml). The organic phase was washed with water, saturated brine and dried (MgSO_4). After removal of the solvent *in vacuo*, the residue was chromatographed on silica gel eluting with ethyl acetate/hexane (5:95 to 20:80) to give 1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-2-((carboxamido)methyl)amino-3,3-diphenylpropane, 2.91g.

h) To a solution of sodium ethoxide (0.78g) in ethanol (10ml) was added molecular sieves (0.5g, A4) and a suspension of hydroxyguanidine hemisulfate hemihydrate (1.8g) in ethanol (10ml). After 1 hour a solution of 1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-2-((carboxamido)methyl)amino-3,3-diphenylpropane (Example 1g, 0.6g) in ethanol (10ml) was added and the suspension heated at 100°C for 2 hours. The suspension was filtered and the filtrate evaporated to dryness. The residue was partitioned between CH_2Cl_2 and water and the organic phase dried (MgSO_4) and evaporated. The residue was purified on silica gel eluting with increasing concentrations of

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methanol (1% to 20%) in a mixture of ethyl acetate/petroleum ether/triethylamine (50:50:1). Oxalic acid (0.028g) was added to the residue, this was crystallised from ethanol/diethyl ether/hexane to give 2-((3-amino-1,2,4-oxadiazol-5-yl)methyl) ammonium-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylpropane bis oxalate salt mp 135-136°C, m/e (CI⁺) = 551 (M+H). Found: C, 51.21; H, 4.19; N, 7.61. $C_{27}H_{24}F_6N_4O_2 \cdot (C_2H_2O_4)_2$ requires C, 50.97; H, 3.86; N, 7.66%. ¹H NMR (360MHz, CDCl₃) δ 7.99 (1H, s), 7.94 (2H, s), 7.41-7.09 (10H, m), 6.16 (2H, bs), 4.57 (1H, d, J = 13.0Hz), 4.48 (1H, d, J = 13.0Hz), 4.06 (1H, d, J = 10.4Hz), 3.85 (2H, bm), 3.50 (1H, dd, J = 10.1Hz, 2.1Hz), 3.30 (1H, dd, J = 10.1Hz, 4.8Hz).

EXAMPLE 2: (2S)-2-((3-amino-1,2,4-oxadiazol-5-yl)methyl amino)-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-2-phenylethane

a) L-2-Phenylglycinol (5g) and di-t-butylidicarbonate (9.4g) was stirred in a dichloromethane solution (30ml) at room temperature for 3 hours. The precipitate which formed was filtered to give N-t-butoxycarbonyl-L-2-phenylglycinol, 4g.

b) 2-N-t-Butoxycarbonylamino-L-2-phenylglycinol (Example 2a) was alkylated with 3,5-bis(trifluoromethyl)benzyl bromide and deprotected in an analogous manner to that described in Example 1e and f to give L-2-ammonium-1-(3',5'-bis(trifluoromethyl)phenyl)methyloxy-2-phenylethane oxalate salt. mp 84-90°C. ¹H NMR (360MHz, MeOH d₄) δ 7.97 (2H, s), 7.89 (1H, s), 7.47-7.41 (5H, m), 4.8 (2H, AB J_{gem} = 12.7Hz), 4.61 (1H, t, J = 5.93Hz), 3.9 (2H, d, J = 5.27Hz). m/e (CI⁺) = 364. Found: C, 48.46; H, 3.75; N, 2.94. $C_{17}H_{15}F_6NO \cdot 1.4(C_2H_2O_4)$ requires C, 48.60; H, 3.67; N, 2.86%.

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c) (2S)-2-Amino-1-(3',5'-bis(trifluoromethyl)phenyl)methoxy-2-phenylethane (Example 2b, liberated from its oxalate salt by extraction into CH_2Cl_2 from aqueous Na_2CO_3 solution) was alkylated with methyl bromoacetate in an analogous manner to that described in Example 1g to give
(2S)-1-((3',5'-bis(trifluoromethyl)phenyl)methoxy)-2-((carbomethoxy)methyl)ammonium-2-phenylethane oxalate salt.
 mp 95-97°C. Found: C, 49.33; H, 3.82; N, 2.61. $\text{C}_{20}\text{H}_{19}\text{F}_6\text{NO}_3 \cdot (\text{C}_2\text{H}_2\text{O}_4)_{1.2}$ requires C, 49.51; H, 3.97; N, 2.58%.

d) Sodium (0.35g) was added to a solution of powdered molecular sieves (A4, 1g) in methanol (17ml) under an atmosphere of nitrogen. To this solution was added hydroxyguanidine hemisulfate hemihydrate (1.2g) and a solution of
(2S)-1-((3',5'-bis(trifluoromethyl)phenyl)methoxy)-2-(((carbomethoxy)methyl)amino)-2-phenylethane (Example 2e, 1.0g), liberated from its oxalate salt by extraction into CH_2Cl_2 from aqueous Na_2CO_3 in methanol (2ml) and the solution was heated to reflux for 6 hours. The solution was cooled to ambient temperature, filtered and evaporated to dryness. A solution of the residue in CH_2Cl_2 was washed with water, saturated brine and dried (MgSO_4). After evaporation the residue was chromatographed on silica gel in ethyl acetate/petroleum ether bp = 60-80°C (30:70) to give
(2S)-((3-amino-1,2,4-oxadiazol-5-yl)methylamino)-1-((3',5'-bis(trifluoromethyl)phenyl)methoxy)-2-phenylethane as an oil. Found: C, 52.0; H, 4.3; N, 11.4. $\text{C}_{20}\text{H}_{18}\text{N}_4\text{O}_2\text{F}_6 \cdot 0.3(\text{CH}_3\text{COC}_2\text{H}_5)$ requires C, 52.31; H, 4.22; N, 11.51%. m/e (CI^+) = 461 (M+H). ^1H NMR (360MHz, CDCl_3) δ 7.6 (3H, s, 2,46-(CF_3)aryl CH), 7.4-7.26 (5H, m, phenyl), 4.6 (2H, s), 4.4 (2H, bs), 4.1 (1H, t, J = 5.2Hz), 3.85 (1H, d, J = 16.4Hz), 3.72 (1H, d, J = 16.4Hz), 3.6 (2H, m), 2.66 (1H, bvs).

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EXAMPLE 3: 3-[N(-2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenylethyl) aminomethyl]-1,2,4-triazole

2(S)-2-Amino-1-(3,5-bis(trifluoromethyl)phenyl)methoxy-2-phenylethane (2.0g; Example 2b, liberated from its oxalate salt by extraction into CH_2Cl_2 from aqueous Na_2CO_3 solution) anhydrous potassium carbonate (3.4g) and N-formyl-2-chloroacetamidohydrazone (1.7g) (prepared according to Yanagisawa, I., *J. Med. Chem.*, 1984, 27, 849) were heated to 60°C in anhydrous dimethylformamide for 3 hours, followed by heating at 130°C for 12h. The reaction mixture was cooled, diluted with ethyl acetate and washed with water (x3). The ethyl acetate layer was dried (MgSO_4), filtered and evaporated to give a brown oil. This was purified on silica eluting with ethyl acetate to afford the title compound as a yellow oil. ^1H NMR (360MHz, CDCl_3) δ 3.64-3.73 (2H, m, CH_2), 3.90 (2H, s, NCH_2 triazole), 4.04-4.09 (1H, m, NCHPh), 4.63 (2H, s, OCH_2Ph), 7.28-7.39 (5H, m, phenyl H), 7.75 (2H, s, ArH), 7.79 (1H, s, ArH), 7.99 (1H, s, triazole-H). m/z (CI^+) = 445 ($\text{M}+\text{H}$). Found: C, 53.49; H, 4.15; N, 12.25. $\text{C}_{20}\text{H}_{18}\text{F}_6\text{N}_4\text{O}$. 0.2 H_2O requires C, 53.62; H, 4.14; N, 12.51%.

EXAMPLE 4: 1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenyl-2-(N-(1,2,4-triazol-3-yl)methyl-N-methylamino)propane

a) To a solution of 2-t-butoxycarbonylamino-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylpropane (Example 1e, 10.75g) in dimethylformamide (40ml) was added sodium hydride (0.58g, 80% suspension in oil). After stirring the solution at room temperature for 0.5h methyl iodide (1.6ml) was added and the solution stirred for a further 16h. Ethyl acetate (200ml) and water (200ml) were added and the organic phase

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washed with saturated brine, dried (MgSO_4) and evaporated *in vacuo*. The residue was purified by chromatography on silica gel to give 2-N-t-butoxycarbonyl-N-methylamino-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylpropane as an oil.

b) The product of Example 4a (2.81g) was dissolved in trifluoroacetic acid (15ml) for 20 minutes. The solvent was removed *in vacuo* and the residue partitioned between CH_2Cl_2 and 2M-NaOH. The organic phase was washed further with 2M-NaOH, saturated brine and dried (MgSO_4) to give to give 1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-methylamino-3,3-diphenylpropane as an oil.

c) The product from Example 4b (1.7g) was dissolved in DMF under a nitrogen atmosphere and potassium carbonate (1.33g) and 2-chloroacetamidhydrazone (0.875g; prepared according to Yanagisawa, I., *et al.*, *J. Med. Chem.*, 1984, 849) were added. The reaction was then heated to 60°C for 24hr followed by heating to 120°C for 4hr. After cooling to room temperature ethyl acetate (100ml) and water (20ml) were added. The water layer was then removed and the organic layer washed with water (3 x 20ml). The organic fraction was dried (MgSO_4), filtered and the solvent removed *in vacuo*. The residue was chromatographed on silica eluting with 50% ethyl acetate/petroleum ether. Removal of solvents *in vacuo* gave a white solid that was filtered and washed with hexane to give 1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenyl-2-(N-(1,2,4-triazol-3-yl)methyl-N-methyl)aminopropane as a white solid. m.p. 138-139°C, ^1H NMR (CDCl_3) δ 7.80 (1H, s, triazole ($\text{CH}=\text{NH}$)), 7.76 (1H, s, ArH), 7.71 (1H, s, ArH), 7.17-7.39 (10H, s, ArH), 4.52 (1H, d, OCHHAr), 4.43 (1H, d, OCHHAr), 4.14 (1H, d, $\text{J}=14\text{Hz}$, MeN-CHH-triazole), 4.11 (H, d, $\text{J}=11\text{Hz}$, PhCHPh), 3.88

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(1H, d, J=14Hz, MeN-CHH-triazole), 3.78 (1H, brs, MeN-CH-CH₂O), 3.66 (1H, d, J=7Hz, CHHOCH₂Ar), 3.53 (1H, dd, J=10, 7Hz, CHHOCH₂Ar). m/e (ACE) 548 (M⁺+1). Found: C, 61.70; H, 4.95; N, 10.31. C₂₈H₂₆N₄O₆ requires C, 61.31; H, 4.78; N, 10.21%.

EXAMPLE 5: 1-((3,5-Bis(trifluoromethyl)phenyl)methyloxy)-2-
[N-((3-thioxo-1,2,4-triazol-5-yl)methyl)-N-methylamino]-3,3-
diphenylpropane

10 a) To a solution of the product of Example 1e (0.92g) in N,N-dimethylformamide (10ml) was added sodium hydride (0.08g, 60% suspension in oil) and methyl iodide (0.12ml). After the solution had been stirred at room temperature for 19h water
15 was carefully added and the product was extracted into ethyl acetate. The organic phase was washed with water (twice), saturated brine, dried (MgSO₄) and concentrated *in vacuo* to give
1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-2-(N-t-butoxy
carbonyl(N-methyl)amino)-3,3-diphenylpropane.

20 b) The product of Example 5a (0.99g) was dissolved in trifluoroacetic acid (10ml) and after 0.5h the mixture was concentrated *in vacuo*. To a solution of the residue dissolved in N,N-dimethylformamide (10ml) was added methyl bromoacetate (0.20ml) and potassium carbonate (0.72g) and the reaction
25 mixture was stirred at 70°C for 15h. Ethyl acetate and water were added and the organic phase was washed with water (twice), dried (MgSO₄) and concentrated *in vacuo*. The residue was purified by chromatography on silica (eluting with 30% diethyl ether in petroleum ether (bp 60-80°C)) to give
30 1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-2-((carbomethoxy)
methyl-(N-methyl)amino)-3,3-diphenylpropane.

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c) Hydrazine hydrate (0.18ml) was added to a solution of the product of Example 5b (0.41g) in ethanol (15ml). After heating the solution at reflux for 18h, the solvent was removed *in vacuo* and the residue partitioned between ethyl acetate and water. The organic phase was dried (MgSO_4) and concentrated to give 1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-2-(((formylhydrazino)methyl)-N-methylamino)-3,3-diphenylpropane, m/z (CI^+) 540 ($\text{M}+\text{H}$).

d) 1-((3,5-Bis(trifluoromethyl)phenyl)methyloxy)-2-(((formylhydrazino)methyl)-N-methylamino)-3,3-diphenylpropane (0.37g, Example 5c), potassium thiocyanate (0.13g) concentrated hydrochloric acid (2ml) and water (10ml) were heated at reflux for 2.75h. After cooling solid potassium hydroxide was added until $\text{pH} > 10$ and the solution was extracted twice with ethyl acetate. The combined organics were dried (MgSO_4) and the solvent evaporated *in vacuo* to give 1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-2-[N-((thiosemicarbazido)methyl)-N-methylamino]-3,3-diphenylpropane, m/z (CI^+) = 599 ($\text{M}+\text{H}$).

This oil was refluxed in 2N NaOH (10ml) for 1.75h. To the cooled reaction mixture was added hydrochloric acid until $\text{pH} = 4-5$ and product partitioned between ethyl acetate and water. The organic phase was dried (MgSO_4) and the solvent removed *in vacuo*. The residue was purified by chromatography on silica (eluting with 40% ethyl acetate in petroleum ether bp 60-80°C) to afford 1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-2-[N-((3-thioxo-1,2,4-triazol-5-yl)methyl)-N-methylamino]-3,3-diphenylpropane as a white crystalline solid. $\text{m.p.} = 192-194^\circ\text{C}$. Found: C, 57.62; H, 4.61; N, 9.67. $\text{C}_{28}\text{H}_{26}\text{N}_4\text{OSF}_6$ requires C, 57.92; H, 4.51; N, 9.65%. m/z (CI^+) = 581 ($\text{M}+\text{H}$).

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EXAMPLE 6: 5-[(N-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenylethyl)-N-methylamino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one oxalate salt

5 a) To a solution of 2-N-t-butoxycarbonylamino-L-2-phenylglycinol (23.7g; Example 2a) and 3,5-bis(trifluoromethyl)benzyl bromide (33.8g) dissolved in dimethylformamide (75ml) was added sodium hydride (80% suspension in oil, 3.3g) in portions over 30 minutes. After stirring the solution at ambient temperature for 1h, water (500ml) and ethyl acetate (500ml) were added. The organic phase was washed further with water (2 x 100ml), saturated brine and dried (MgSO₄). After evaporation *in vacuo* the residue was chromatographed on silica (eluting with 5% ethyl acetate in petroleum ether bp 60-80°C) to give (S)-1-((3,5

10 bis(trifluoromethyl)phenyl)methoxy)-2-N-t-butoxycarbonyl amino-2-phenylethane, m.p. = 53-54°C.

15

b) To a solution of (S)-1-((3,5-bis(trifluoromethyl) phenyl)methoxy)-2-N-t-butoxycarbonylamino-2-phenylethane (3g; Example 6a) in tetrahydrofuran (10ml) and dimethylformamide (2ml) was added sodium hydride (0.21g; 80% suspension in oil). After the effervescence had subsided (15 minutes) methyl iodide (1.62ml) was added. After stirring the solution for 2h at ambient temperature, water (50ml) and ethyl acetate (50ml) were added and the organic phase was washed with saturated brine and dried (MgSO₄). After evaporation to dryness *in vacuo* the residue was chromatographed on silica (eluting with 0 to 5% ethyl acetate in petroleum ether bp 60-80°C) to give (S)-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-

20 (N-t-butoxycarbonyl-N-methyl)amino-2-phenylethane, mp = 61° C, m/z (CI⁺) = 478 (M+H).

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c) The product of Example 6b (5.26g) was dissolved in methanol saturated with hydrogen chloride (30ml) for 4.5h. The solution was evaporated to dryness and the residue crystallized from diethylether:hexane (1:1) to give
5 1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-methylamino-2-phenylethane hydrochloride, mp = 169-172°C.

d) Sodium methoxide (0.032g) was added to a solution of chloroacetonitrile (1.26ml) in anhydrous methanol (15ml) at 0°C. The reaction mixture was stirred at room temperature for 0.5h
10 and then neutralised with acetic acid (0.034ml). Methylhydrazinocarboxylate (1.79g) was added and the reaction mixture stirred at room temperature for 0.5h. The solution was concentrated *in vacuo* to give N-carbomethoxy-2-chloroacetamidrazone as an orange solid. m/z (CI)⁺ = 166 (M+H).

e) The product of Example 6c (liberated as free base by partitioning between ethyl acetate and aqueous Na₂CO₃ followed by drying (MgSO₄) and evaporation; 5.5g), anhydrous K₂CO₃ and N-carbomethoxy-2-chloroacetamidrazone (3.6g, Example 6d) were heated in anhydrous dimethylformamide at 60°C for 1h and
20 at 120°C for 6h. Water (300ml) and ethyl acetate (300ml) were added and the organic phase was washed with water (3 x 100ml), saturated brine (1 x 100ml) and dried (MgSO₄). After evaporation *in vacuo* the residue was dissolved in toluene and the solution heated at 120°C for 6h and at 140°C for 16h. The
25 solvent was removed *in vacuo* and the residue chromatographed on silica (eluting with 10% methanol in ethyl acetate). The purified product was dissolved in methanol/ethyl acetate and oxalic acid (1.31g) added. The solution was evaporated to dryness and the residue recrystallized from 5% methanol in ethyl
30 acetate to give 5-((N-((2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methyl)ammonium)

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methyl-2,3-dihydro-4H-1,2,4-triazol-3-one oxalate salt. ^1H NMR (360MHz, MeOD) d 2.44 (3H; s; N-CH_3), 3.68 (1H; d; $J = 14.6$; $\text{CH}_\text{A}\text{H}_\text{B}\text{CHPh}$), 3.77 (1H; d; $J = 14.6$ Hz; $\text{CH}_\text{A}\text{H}_\text{B}\text{CHPh}$), 3.91-4.06 (2H; m; CH_2 triazalone), 4.23 (1H; t; NCHPh), 4.65-4.67 (2H; m; CH_2CHPh), 7.30-7.39 (5H; m; Ar H), 7.78-7.79 (3H; m; Ar H). $m/z = 475$ (CI^+). Found: C, 48.94; H, 3.93; N, 9.93. $\text{C}_{21}\text{H}_{20}\text{F}_6\text{N}_4\text{O}_2 \cdot \text{C}_2\text{H}_2\text{O}_4$ requires C, 49.11; H, 3.76; N, 9.80%.

EXAMPLE 7: 5-[N-((2-((3,5-Bis(trifluormethyl)phenyl)methoxy)-1-phenylethyl)ammonium)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one oxalate salt

The product of Example 2b (2.0g), anhydrous K_2CO_3 (2.3g) and N-carbomethoxy-2-chloroacetamidrazone (1.3g, Example 6d) were heated at 60°C in anhydrous dimethyl formamide for 1h, then at 140°C for 1h. The solution was cooled, dissolved in ethyl acetate (250ml) and water (250ml) and the organic phase washed further with water (x 2), saturated brine and dried (MgSO_4). The solvent was removed *in vacuo* and the residue chromatographed on silica (eluting with ethyl acetate) and crystallized as the oxalate salt to give the title compound. ^1H NMR (360MHz, MeOD) d 3.67 (2H; s; NCH_2 triazalone), 3.71-3.82 (2H; m; CH_2), 4.27-4.30 (1H; m; NCHPh), 4.60-4.67 (2H; m; OCH_2Ph), 7.26-7.37 (5H; m; Ar H), 7.78 (1H; s; Ar H), 7.82 (2H; s; Ar H); m/z (CI^+) = 461 (M+H). Found: C, 49.17; H, 3.66; N, 10.79. $\text{C}_{20}\text{H}_{18}\text{F}_6\text{N}_4\text{O}_2 \cdot 0.7\text{C}_2\text{H}_2\text{O}_4$ requires C, 49.11; H, 3.74; N, 10.71%.

EXAMPLE 8: 5-[N-(2-(((3-tert-Butyl-5-methyl)phenyl)methoxy)-1-phenylethyl))-N-methylamino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

a) 5-tert-butyl-m-xylene (15g) was dissolved in carbon tetrachloride (80ml), N-bromosuccinimide (16.45g) and a

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catalytic amount of azoisobutyronitrile were added and the reaction was heated at reflux for 4h. The reaction was cooled and the mixture filtered to remove the succinimide. The solvent was removed *in vacuo* to afford a light brown oil. Purification was carried out by chromatography on silica gel (eluting silica with 100% petroleum ether, bp 60-800C) to afford 3-t-butyl-5-methylbenzyl bromide as a clear oil (15.3g). ¹H NMR (360MHz, CDCl₃) d 1.31 (9H; s; t-Bu), 2.34 (3H; s; CH₃), 4.47 (2H; s; CH₂ Br), 7.04 (1H; s; Ar H), 7.13 (1H; s; Ar H), 7.25 (1H; s; Ar H). m/z (CI⁺) = 258 (M + NH₄⁺).

b) (S) 1-(((3-t-butyl-5-methyl)phenyl)methyloxy)-2-methylamino-2-phenylethane hydrochloride

The title compound was prepared by a procedure analogous to that described in Example 6 using (3-t-butyl-5-methyl)benzyl bromide (Example 8a) mp 144-148°C. ¹H NMR (360MHz, DMSO) d 1.24 (9H; s; tert-Bu), 2.27 (3H; s; Ar CH₃), 2.39 (3H; s; N-CH₃), 3.78-3.83 (1H; dd; J_{AB} = 11Hz, J = 5Hz; CH-CHHO), 3.89-3.94 (1H, dd, J₁ = 11Hz J₂ = 7Hz, CHCHHO), 4.46-4.56 (3H, m, OCH₂ + CHPh), 6.92 (1H, s, ArH), 7.09 (1H, s, ArH), 7.11 (1H, s, ArH), 7.43-7.47 (3H, m, ArH), 7.56-7.61 (3H, m, ArH).

c) The product of Example 8b was converted to the title compound by reaction with N-carbomethoxy-2-chloroacetamidrazone (Example 6a) in an analogous manner to that described in Example 6e to give 5-[N-(2-(((3-t-Butyl, 5-methyl)phenyl)methyloxy)-1-phenylethyl))-N-methylamino) methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one. Mp 125-130°C. ¹H NMR (360MHz, DMSO) d 1.27 (9H; s; t-Bu), 2.28 (3H; s; Ar CH₃), 2.59 (3H; bs; N-CH₃), 3.92-3.99 (3H; m), 4.15-4.22 (1H; m), 4.51-4.61 (3H; m), 6.89 (1H; s; Ar H), 7.06 (1H; s; Ar H), 7.11 (1H; s; Ar H), 7.34-7.45 (3H; m; Ar H), 7.58-7.60 (2H; m; Ar H). m/z

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(Cl⁺) = 409 (M+H⁺, 100%). Found: C, 62.47; H, 7.67; N, 12.49. C₂₄H₃₂N₄O₂.HCl requires C, 62.26; H, 7.62; N, 12.15.

EXAMPLE 9: 5-[(N-(1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl)-N-methylamino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-2-methylamino-3,3-diphenylpropane (Example 4b, 1.15g), N-Carbo-methoxy-2-chloroacetamidrazone (Example 6d, 0.49g) and potassium carbonate (1.02g) were heated in dimethylformamide (30ml) at 60°C for 20min. The reaction mixture was then heated to 160°C for 1.5h before cooling, diluting with water and extracting the product into ethyl acetate. The organic phase was washed with water (30ml) and brine (30ml) dried (MgSO₄) and evaporated to dryness. The product was purified on silica eluting with petroleum ether/ethyl acetate mixtures to give the title compound. ¹H NMR (360MHz, DMSO-d₆) δ 3.26-3.30 (1H, m), 3.48-3.51 (3H, m), 3.60-3.80 (1H, m), 4.06 (1H, d, J = 10.3Hz), 4.47-4.58 (2H, ABq, J = 13.1Hz), 7.08-7.35 (10H, m), 7.94 (2H, s) and 8.0 (1H, s). Found: C, 59.57; H, 4.64; N, 9.93; C₂₈H₂₆N₄O₂F₆ requires C, 59.59; H, 4.57; N, 9.97%.

EXAMPLE 10: 5-[(N-(1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl)amino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

The title compound was prepared from 2-amino-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylpropane (Example 1f) using a procedure analogous to that described in Example 9. ¹H NMR (360MHz, DMSO-d₆) δ 3.28 (1H, q, J = 4.4 and 10Hz), 3.48-3.51 (3H, m), 3.70-3.76 (1H, m), 4.06 (1H, d, J = 9.6Hz), 4.47-4.57 (2H, ABq, J = 13Hz), 7.08-7.35 (10H, m), 7.94

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(2H, s) and 8.0 (1H, s). Found: C, 54.73; H, 4.11; N, 8.85; $C_{27}H_{24}N_4O_2F_6 \cdot C_2H_2O_4$ requires C, 54.38; H, 4.09; N, 8.75%.

EXAMPLE 11: 5-[N-((2S)-2-(1-(3,5-dichlorophenyl)methoxy)-2-phenyl)ethyl)aminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

The title compound was prepared using a procedure analogous to that described in Example 8b, mp 124-127°C. 1H NMR (360MHz, MeOD) δ 2.45 (3H, s, N-CH₃), 3.71 (1H, d, J=14.59Hz, CH_AH_BCHPh), 3.78 (1H, d, J=14.59Hz, CH_AH_BCHPh), 3.84-4.00 (2H, m), 4.23 (1H, t, NCHPh), 4.47 (2H, m, CH₂Ar), 7.17 (2H, s, ArH), 7.32 (1H, s, ArH), 7.34-7.36 (5H, m, ArH) m/z (CI⁺)=408. Found: C, 50.38; H, 4.52; N, 11.09. $C_{19}H_{20}Cl_2N_4O_2 \cdot C_2H_2O_4$ requires C, 50.72; H, 4.46; N, 11.27%.

EXAMPLE 12: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]imidazolidine-2,4-dione hydrochloride

a) (S)-2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl-1-(N-t-butoxycarbonylamino)ethane (1.1g, Example 2b) was dissolved in 20ml anhydrous DMF and sodium hydride (0.085g) was added. The reaction mixture was stirred for 20 min and allyl bromide (0.300g) added and stirred for a further 16h. The reaction was quenched by the addition of water (30ml) and poured into 100ml ethyl acetate. The organic layer was washed with water (3 x 20ml), brine and dried (MgSO₄). The solvent was removed *in vacuo* and the residue chromatographed on silica eluting with 10% Ethyl acetate/hexane to give (S)-2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl-1-(N-t-butoxycarbonyl-N-allylamino)ethane as a colourless oil 0.980g. m/z = 504 (M+H).

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b) The product of Example 12a (4.00g) was dissolved in 1:1 MeOH/CH₂Cl₂ (10ml) and cooled to -78°C. Ozone was bubbled through the reaction mixture for 0.5h. N₂ was then bubbled through for 5 min and methyl sulfide (0.17ml) was added. After warming the reaction mixture to room temperature, the solvent was removed to give the crude aldehyde, m/z = 506 (M+H). The crude aldehyde (0.390g) was dissolved in 1:1 ethanol/water (10ml) and potassium cyanide (0.100g) was added followed by ammonium carbonate (0.370g) and the reaction stirred at 65°C for 16h. The ethanol was then removed and the aqueous layer extracted with ethyl acetate (2 x 50ml). The organic layers were combined, washed with satd. NH₄Cl and dried (MgSO₄) filtered and the solvent removed *in vacuo*. The resulting residue was chromatographed on silica eluting with 40% ethyl acetate/hexane to give a colourless oil, m/z = 576 (M+H). This intermediate was then dissolved in anhydrous HCl/MeOH and stirred for 2h. The solvent was then removed and the compound precipitated with ether to give 5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethylimidazolidine-2,4-dione hydrochloride as a white solid. ¹H NMR (CDCl₃) δ 7.81 (4H, m, Ar-H and CONHCO), 7.3 (5H, m, Ar-H), 6.5 (1H, s, C-CH-NH), 4.6 (1H, dd, CH-Ph), 3.8-4.2 (2H, m, OCH₂Ar), 3.5 (2H, m, CH₂O), 2.8-3.0 (2H, m, NH-CH₂-Het). m/z = 476 (M+H). Anal. Calcd. for C₂₁H₂₀N₃O₃F₆Cl : C, 49.27; H, 3.94; N, 8.20: Found: C, 49.60; H, 3.94; N, 8.50%.

EXAMPLE 13: (S)-3-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-1,2,4-triazole

The title compound was prepared as an oil from (S)-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-(N-t-butoxycarbonyl-N-

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5 methyl)amino-2-phenylethane (Example 6b) using a procedure analogous to that described in Example 4c. ^1H NMR (360MHz, CDCl_3) δ 2.33 (3H, s), 3.67-3.72 (1H, m), 3.80-3.84 (1H, dd), 3.75-4.06 (4H, m), 4.66 (2H, s), 7.31-7.40 (5H, m), 7.72 (2H, s), 7.79 (1H, s), 8.00 (1H, s). m/z (CI^+) = 459. Found: C, 54.91; H, 4.49; N, 11.87. $\text{C}_{21}\text{H}_{20}\text{F}_6\text{N}_4\text{O}$ requires C, 55.02; H, 4.40; N, 12.22%.

10 EXAMPLE 14: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-ethylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

The title compound was prepared as an oil by a procedure analogous to that described in Example 6 using ethyl iodide. ^1H NMR ($\text{DMSO}-d_6$) δ 0.93 (3H, t), 2.40-2.45 (1H, m), 2.55-2.65 (1H, m), 3.38 (1H, d, $J = 14.93\text{Hz}$), 3.55 (1H, d, $J = 14.93\text{Hz}$), 3.88-4.05 (3H, m), 4.66 (2H, dd), 7.22-7.33 (3H, m), 7.40 (1H, s), 7.41 (1H, s), 7.84 (2H, s), 7.89 (1H, s), 10.90 (2H, bs). m/z (CI^+) = 489 ($\text{M}+\text{H}$). Found: C, 54.47; H, 4.59; N, 11.26. $\text{C}_{22}\text{H}_{22}\text{F}_6\text{N}_4\text{O}_2$ requires C, 54.10; H, 4.54; N, 11.47%.

20 EXAMPLE 15: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-propylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

25 The title compound was prepared as an oil by a procedure analogous to that described in Example 6 using propyl iodide. ^1H NMR (360MHz, $\text{DMSO}-d_6$) δ 0.72 (3H, t), 1.33-1.39 (2H, m), 2.22-2.30 (1H, m), 2.38-2.43 (1H, m), 3.26 (1H, d, $J = 14.73\text{Hz}$), 3.57 (1H, d, $J = 14.73\text{Hz}$), 3.94-4.04 (3H, m), 4.67 (2H, dd), 7.24-7.41 (5H, m), 7.87 (2H, s), 7.98 (1H, s), 11.16 (1H, s), 11.23 (1H, bs). m/z (CI^+) = 503. Found: C, 54.62; H, 4.68; N, 10.94. $\text{C}_{23}\text{H}_{24}\text{F}_6\text{N}_4\text{O}_2$ requires C, 54.98; H, 4.82; N, 11.15%.

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EXAMPLE 16: (R)-5-[N-(1-(2-((Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-ethylaminomethyl)-2,3-dihydro-4H-1,2,4-triazol-3-one

5 The title compound was prepared using a procedure analogous to that described in Example 6 starting with D-phenylglycinol, mp 165-169°C. ¹H NMR (360MHz, MeOD) δ 1.2 (3H, t), 2.86-2.95 (1H, m), 3.05-3.14 (1H, m), 3.86 (1H, d, J = 15.19Hz), 4.04-4.16 (3H, m), 4.52 (1H, t), 4.73 (2H, dd), 7.37-7.44 (3H, m), 7.49-7.52 (2H, m), 7.87 (3H, s). m/z (CI⁺) = 489. Found: 10 C, 50.05; H, 4.02; N, 9.83. C₂₂H₂₂F₆N₄O₂·C₂H₂O₄ requires C, 49.83; H, 4.18; N, 9.69%.

EXAMPLE 17: (S)-3-[1-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-ethylaminoethyl]-1,2,4-triazole

15 a) Sodium methoxide (.162g) was added to a solution of 2-chloropropionitrile (10.5g) in anhydrous methanol (150ml) at 0°C. The reaction mixture was stirred at room temperature for 1h, then neutralised with acetic acid (.18ml). N-Formylhydrazine (7.04g) was added and the mixture was stirred 20 overnight. The resulting pink solution was concentrated *in vacuo* to give N-formyl-2-chloropropionamidohydrazone as a pink solid.

25 b) The title compound as a mixture of diastereomers (1:1) was prepared as an oil by a procedure analogous to that described in Example 3 using N-formyl-2-chloropropionamidohydrazone (Example 17a). ¹H NMR (360MHz, CDCl₃) δ 1.00 (1.5H, t, J = 7.10Hz), 1.08 (1.5H, t, J = 7.10Hz), 1.24 (1.5H, d, J = 9.03Hz), 1.54 (1.5H, d, J = 7.00Hz), 2.63-2.92 (2H, m), 3.66-4.06 (2H, m), 30 4.21-4.36 (2H, m), 4.70-4.71 (2H, m), 7.26-7.39 (5H, m), 7.73-7.89

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(3H, m). m/z (CI⁺) = 487. Found: C, 56.64; H, 4.87; N, 10.82. $C_{23}H_{24}F_6N_4O \cdot 0.2C_4H_8O_2$ requires C, 56.71; H, 5.12; N, 11.12%.

EXAMPLE 18: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]-tetrazole

a) Bromoacetonitrile (570 μ l) was stirred in a 0.5M solution of anhydrous DMF (15ml) at 60°C with potassium carbonate (2.07g) for 5 minutes before (S)-2-amino-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-phenylethane (2.7g, Example 2b, liberated from the salt by extraction into ethyl acetate from aqueous Na₂CO₃ solution) was added. After 1.5 hours, the solution was cooled and the reaction quenched with water (100ml) and diluted with Ethyl acetate (60ml). The mixture was separated and the aqueous layer further extracted with ethyl acetate (4 x 30ml). The combined organic extracts were washed with brine (1 x 30ml), dried (MgSO₄) and evaporated to a dark oil (4.1g). The crude oil was purified by flash silica gel chromatography in Ethyl acetate/hexane (1:1) to yield (S)-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-cyanomethylamino-2-phenylethane as a viscous oil 2.5g. ¹H NMR (250MHz, CDCl₃) δ 7.82 (1H, s, Ar), 7.79 (2H, s, ArH), 7.36 (5H, m, Ph), 4.67 (2H, s, OCH₂Ar), 4.27 (1H, t, J = 6.5Hz, PhCHN), 3.68 (1H, d, J = 17Hz) and 3.31 (1H, d, J = 17Hz, CH₂CN). m/z (CI⁺) 403 (M+1, 100%).

b) (S)-1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-2-cyanomethylamino-2-phenylethane (2.41g, Example 18a) was heated with triethylamine hydrochloride (1.32g, 9.6mmol) and sodium azide (1.17g) in anhydrous 2-methylpyrrolidinone (12ml) at reflux for 1.5 hours. The cooled solution was poured into ice/water (140ml), acidified to pH 2 with 2N HCl and extracted with Ethyl acetate (5 x 30ml). The combined organic extracts were washed with brine (1 x 20ml), dried (MgSO₄) and

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evaporated to dryness (3.5g). The crude residue was purified by flash silica gel chromatography in dichloromethane-methanol (9:1), to give a white solid (1.97g). Crystallisation from Ethyl acetate-hexane yielded (S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]tetrazole as a white powder, mp 81-82°C (sinters 68-75°C). ¹H NMR (360MHz, DMSO-d₆) δ 8.00 (1H, s) and 7.93 (2H, s, ArH), 7.43 (2H, m) and 7.29-7.38 (3H, m, Ph), 4.67 (2H, s, OCH₂Ar), 4.10 (1H, bs, PhCHN), 3.69 (2H, s, NCH₂CN), 3.62-3.73 (2H, m, CH₂O). m/z (CI⁺) 446 (M+1, 5%); (CI⁻) 425 (M-HF, 18%), 242 (ArCHO, 100%). Found: C, 51.23; H, 3.85; N, 15.73. C₁₉H₁₇F₆N₅O requires C, 51.25; H, 3.94; N, 15.07%.

EXAMPLE 19: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]-2-N-methyltetrazole

(S)-5-[N-((2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]tetrazole (1.50g, Example 18) was suspended in ice-cold diethyl ether (20ml) and treated with a slight excess of ethereal diazomethane solution. The reaction was allowed to warm to room temperature and after 3 hours, a few drops of glacial acetic acid were added. The solution was evaporated to dryness (1.6g) and the crude concentrate purified by flash silica gel chromatography in Ethyl acetate-hexane (30-50%) to yield the title compound as clear oil. ¹H NMR (360MHz, DMSO-d₆) δ 7.98 (1H, s) and 7.95 (2H, s, ArH), 7.25-7.41 (5H, m, Ph), 4.68 (2H, s, OCH₂Ar), 4.31 (3H, s, NMe), 4.00 (1H, t, J = 6.4Hz, PhCHN), 3.85 (1H, d, J = 14.5Hz) and 3.72 (1H, d, J = 14.5Hz, CH₂N), 3.55-3.65 (2H, m, CH₂O). m/z (CI⁺) = 460 (M+1, 100%). Found: C, 52.20; H, 3.85; N, 15.37. C₂₀H₁₉F₆N₅O requires C, 52.28; H, 4.18; N, 15.25%.

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EXAMPLE 20: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]-1-N-methyl-tetrazole

The title compound was prepared as an oil by a procedure analogous to that described in Example 19. ¹H NMR (360MHz, DMSO-d₆) δ 8.03 (1H, s) and 7.97 (2H, s, ArH), 7.30-7.43 (5H, m, Ph), 4.70 (2H, s, OCH₂Ar), 4.00 (3H, s, tet-NMe), 3.85-4.02 (3H, bm, CH₂NCHPh), 3.59-3.69 (2H, m, CH₂O), 3.36 (3H, s, NMe). m/z (CI⁺) = 460 (M+1, 100%).

EXAMPLE 21: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methyl-aminomethyl]-tetrazole oxalate salt

a) 1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-2-methylamino-2-phenylethane (3.82g, Example 6c) was reacted in an analogous procedure as described in Example 18a to give (S)-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-(N-methyl-N-(cyanomethyl)amino)-2-phenylethane as large, pale yellow plates 3.44g. mp 110-111°C (MeOH). ¹H NMR (360MHz, CDCl₃) δ 7.77 (1H, s) and 7.68 (2H, s, ArH), 7.37 (5H, m, Ph), 4.62 (1H, d, J = 12.8Hz) and 4.56 (1H, d, J = 12.8Hz, OCH₂Ar), 3.87 (1H, dd, J = 10.2, 5.7Hz, PhCHN), 3.66-3.78 (3H, m, CH₂CN and CHHO), 3.48 (1H, d, J = 17.2Hz, CHHO), 2.45 (3H, s, NMe). m/z (CI⁺) = 417 (M+1, 100%).

b) The title compound was prepared by a procedure analogous to that described in Example 18b. Purification by flash silica gel chromatography yielded the product as a gum (3.3g). The oxalate salt was prepared which yielded a white solid. mp 104-106°C (Et₂O). ¹H NMR (360MHz, DMSO-d₆, free base) δ 7.97 (1H, s) and 7.87 (2H, s, ArH), 7.28-7.46 (5H, m, Ph), 4.68 (2H, s, OCH₂Ar), 3.87-4.02 (5H, m, CH₂N(Me)CH(Ph)CH₂O),

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2.16 (3H, s, NMe). m/z (CI⁺, free base) = 460 (M+1, 100%). Found: C, 48.46; H, 3.75; N, 12.24. $C_{20}H_{19}F_6N_5O.(COOH)_2$ requires C, 48.09; H, 3.85; N, 12.75%.

5 EXAMPLE 22: 5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-2-N-methyltetrazole

The title compound was prepared by a procedure analogous to that described in Example 21. ¹H NMR (360MHz, d₆-DMSO) δ 7.98 (1H, s) and 7.86 (2H, s, ArH), 7.27-7.41 (5H, m, Ph), 4.67 (2H, s, OCH₂Ar), 4.33 (3H, s, tet-NMe), 3.64-4.01 (4H, m, CH₂N(Me)CHCHHO), 3.76 (1H, d, J = 14.4Hz, CHHO), 2.17 (3H, s, NMe). m/z (CI⁺) 474 (M+1, 100%). Found: C, 52.82; H, 4.41; N, 15.03. $C_{21}H_{21}F_6N_5O$ requires C, 53.28; H, 4.47; N, 14.79%.

15 EXAMPLE 23: (S)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methyl-aminomethyl]-1-N-methyl tetrazole

The title compound was prepared by a procedure analogous to that described in Example 19. ¹H NMR (360MHz, DMSO-d₆) δ 8.00 (1H, s) and 7.90 (2H, s, ArH), 7.30-7.40 (5H, m, Ph), 4.69 (2H, s, OCH₂Ar), 3.61-4.07 (5H, m, CH₂N(Me)CH(Ph).CH₂O), 2.07 (3H, s, NMe). m/z (CI⁺) = 474 (M+1, 100%). Found: C, 53.00; H, 4.40; N, 14.76. $C_{21}H_{21}F_6N_5O$ requires C, 53.28; H, 4.47; N, 14.78%.

25 EXAMPLE 24: (R)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)-ethyl)-N-methylaminomethyl]-tetrazole

30 a) (R)-1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-2-(N-cyanomethyl-N-methylamino)-2-phenylethane was prepared by a

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procedure analogous to that described in Example 21 from the (R) phenylglycinol, mp = 110-111°C. All spectra data was identical to that described in Example 21a.

5 b) The title compound isolated as the oxalate salt was prepared by a procedure analogous to that described in Example 21b, mp 108-109°C (Et₂O) giving identical spectral data.

10 EXAMPLE 25: (R)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-2-N-methyltetrazole

The title compound was prepared by a procedure analogous to that described in Example 19. All spectral data was identical to that described in Example 22.

15 EXAMPLE 26: (R)-5-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-1-N-methyltetrazole

20 The title compound was prepared by a procedure analogous to that described in Example 19. All spectral data was identical to that described in Example 23.

25 EXAMPLE 27: (S)-5-[2-[N-(1-(2-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminoethyl]-tetrazole Oxalate salt

30 a) 1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-2-methylamino-2-phenyl ethane (1.70g, Example 6c, free base) was heated at reflux with acrylonitrile (329μl) in anhydrous methanol (10ml) for 18 hours. The solution was evaporated to dryness (2.0g). The crude black oil was purified by flash silica gel chromatography in hexane-Ethyl acetate (4:1) to yield (S)-1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-2-(N-methyl-N-2-

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(cyanoethyl)amino)-2-phenylethane as a lightly coloured oil, 1.30g. ^1H NMR (360MHz, DMSO- d_6) δ 7.98 (1H, s) and 7.89 (2H, s, ArH), 7.25-7.37 (5H, m, Ph), 4.69 (2H, s, OCH_2Ar), 3.81-3.95 (3H, m, $\text{PhCH}\cdot\text{CH}_2\text{O}$), 2.56-2.75 (4H, m, $\text{CH}_2\text{CH}_2\text{CN}$), 2.18 (3H, s, NMe). m/z (CI^+) = 431 ($\text{M}+1$, 100%). Found: C, 58.67; H, 4.72; N, 6.42. $\text{C}_{21}\text{H}_{20}\text{F}_6\text{N}_2\text{O}$ requires C, 58.60; H, 4.68; N, 6.51%.

b) The title compound was prepared from the product of Example 27a by an analogous procedure as described in Example 17b. Purification by flash silica gel chromatography in dichloromethane-methanol (19:1) yielded the product which was crystallised as the oxalate salt, mp 72-73°C (Et_2O). ^1H NMR (360MHz, DMSO- d_6) δ 7.99 (1H, s) and 7.89 (2H, s, ArH), 7.32 (5H, m, Ph), 4.68 (2H, s, $\text{OCH}_2\text{-Ar}$), 4.08 (1H, t, $J = 6.1\text{Hz}$, PhCH), 3.95 (1H, m) and 3.85 (1H, m, CH_2O), 3.10 (2H, t, $J = 7\text{Hz}$) and 2.86-3.01 (2H, m, $\text{CH}_2\text{CH}_2\text{N}$), 2.32 (3H, s, NMe). m/z (CI^+) = 474 ($\text{M}+1$, 100%). Found: C, 49.16; H, 4.02; N, 12.27. $\text{C}_{21}\text{H}_{21}\text{F}_6\text{N}_5\text{O}(\text{COOH})_2$ requires C, 49.03; H, 4.11; N, 12.43%.

EXAMPLE 28: (S)-5-[N-((2-(((3-Chloro-5-methyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

The title compound was prepared in an analogous procedure as described in Example 6 using 3-chloro-5-methylbenzyl bromide as the alkylating agent, mp 108-110°C. m/z (CI^+) = 386 ($\text{M}+\text{H}$). Found: C, 54.71; H, 5.87; N, 12.51. $\text{C}_{20}\text{H}_{23}\text{N}_4\text{O}_2\text{Cl}\cdot\text{H}_2\text{O}\cdot\text{HCl}$ requires C, 54.43; H, 5.92; N, 12.69%.

EXAMPLE 29: (S)-5-[N-(1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl)-N-methylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

The title compound was prepared in an analogous procedure as described in Example 1a-f, 4a, b and 9 using (S)- β,β -

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diphenylalanine hydrochloride. All spectral data was identical to that described in Example 9.

5 EXAMPLE 30: (R)-5-[N-{1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl}-N-methylamino methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

10 The title compound was prepared in an analogous procedure as described in Example 1a-f, 4a, b and 9 using (R)- β,β -diphenylalanine hydrochloride. All spectral data was identical to that described in Example 9.

EXAMPLE 31: 5-[N-{1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl}-N-ethylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one

15 a) 1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-2-ethylamine-3,3-diphenylpropane was prepared in an analogous procedure as outlined in Examples 4a and 6 using ethyl iodide in place of methyl iodide.

20 b) The title compound was prepared using the product from Example 31a in an analogous procedure as outlined in Example 9. ^1H NMR (360MHz, DMSO- d_6) δ 7.99 (1H, s), 7.89 (2H, s), 7.39-7.08 (10H, m), 4.49-4.42 (2H, ABq, $J = 13.1\text{Hz}$), 4.20 (1H, d, $J = 11.5\text{Hz}$), 4.00-3.96 (1H, m), 3.57-3.46 (4H, m), 2.72-2.54 (2H, m) and 0.73 (3H, t, $J = 6.9\text{Hz}$). m/z (CI $^+$) = 579 (M+H).

25 EXAMPLE 32: 5-[N-{1-((3,5-Bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl}-N-methyl-aminomethyl]-N-methyl-2,3-dihydro-4H-1,2,4-triazol-3-one

30 To a solution of the product from Example 9 (0.1g) in dimethylformamide (5ml) was added sodium hydride (80% suspension in oil, 0.0065g) and methyl iodide (0.055ml). After

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stirring the solution at room temperature for 18h water and ethyl acetate were added. The organic phase was washed with water (5 x 100ml) and brine, dried (MgSO_4) and evaporated *in vacuo*. Purification by chromatography on silica gel (eluting with mixtures of ethyl acetate and petroleum ether bp 60-80°C) gave the title compound as an oil. ^1H NMR (360MHz, CDCl_3) δ 7.80 (1H, s), 7.70 (2H, s), 7.32-7.09 (10H, m), 4.43-4.31 (2H, ABq, $J = 12.5\text{Hz}$), 4.10 (1H, d, $J = 11.3\text{Hz}$), 3.86-3.51 (5H, m), 3.42 (3H, s), 2.40 (3H, d, $J = 7.5\text{Hz}$).

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The following examples illustrate pharmaceutical compositions according to the invention.

EXAMPLE 33A Tablets containing 1-25mg of compound

5		<u>Amount mg</u>		
	Compound of formula (I)	1.0	2.0	25.0
	Microcrystalline cellulose	20.0	20.0	20.0
	Modified food corn starch	20.0	20.0	20.0
	Lactose	58.5	57.5	34.5
10	Magnesium Stearate	0.5	0.5	0.5

EXAMPLE 33B Tablets containing 26-100mg of compound

		<u>Amount mg</u>		
	Compound of formula (I)	26.0	50.0	100.0
15	Microcrystalline cellulose	80.0	80.0	80.0
	Modified food corn starch	80.0	80.0	80.0
	Lactose	213.5	189.5	139.5
	Magnesium Stearate	0.5	0.5	0.5

20 The compound of formula (I), cellulose, lactose and a portion of the corn starch are mixed and granulated with 10% corn starch paste. The resulting granulation is sieved, dried and blended with the remainder of the corn starch and the magnesium stearate. The resulting granulation is then compressed into tablets containing
25 1.0mg, 2.0mg, 25.0mg, 26.0mg, 50.0mg and 100mg of the active compound per tablet.

EXAMPLE 34 Parenteral injection

30		<u>Amount mg</u>	
	Compound of formula (I)	1 to 100mg	
	Citric Acid Monohydrate	0.75mg	
	Sodium Phosphate	4.5mg	
	Sodium Chloride	9mg	
	Water for Injections	to 1ml	

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The sodium phosphate, citric acid monohydrate and sodium chloride are dissolved in a portion of the water. The compound of formula (I) is dissolved or suspended in the solution and made up to volume.

5

EXAMPLE 35 Topical formulation

	<u>Amount mg</u>
Compound of formula (I)	1-10g
Emulsifying Wax	30g
10 Liquid paraffin	20g
White Soft Paraffin	to 100g

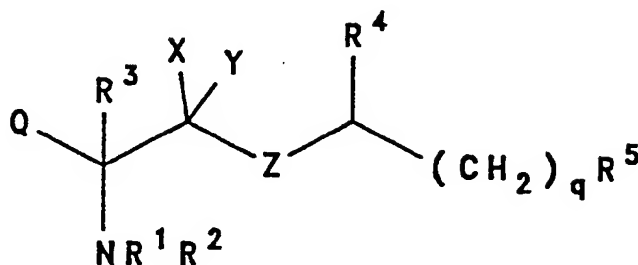
The white soft paraffin is heated until molten. The liquid paraffin and emulsifying wax are incorporated and stirred until dissolved. The compound of formula (I) is added and stirring continued until dispersed. The mixture is then cooled until solid.

15

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CLAIMS

1. A compound of formula (I), or a salt or
5 prodrug thereof:



(I)

wherein

Q represents optionally substituted phenyl or optionally substituted benzhydryl;

20 X and Y each represent H or X and Y together form a group =O;

Z represents O, S or NR^8 , where R^8 represents H or C_{1-6} alkyl;

25 R^1 represents H, C_{1-6} alkyl optionally substituted by hydroxy, cyano, COR^a , COOR^a , CONR^aR^b , $\text{COC}_{1-4}\text{alkylNR}^a\text{R}^b$, $\text{CONR}^a\text{C}_{1-4}\text{alkylCONR}^a\text{R}^b$ or NR^aR^b , (where R^a and R^b each independently represent H, C_{1-6} alkyl or C_{0-4} alkylphenyl optionally substituted in the phenyl ring by one or more of C_{1-6} alkyl, C_{1-6} alkoxy, halo and trifluoromethyl), phenyl(C_{1-4} alkyl), (optionally
30 substituted by one or more of C_{1-6} alkyl, C_{1-6} alkoxy, halo and trifluoromethyl in the phenyl ring), C_{2-6} alkylene, COR^a , COOR^a , CONHR^a , $\text{COC}_{1-4}\text{alkylNR}^a\text{R}^b$, or $\text{CONR}^a\text{C}_{1-4}\text{alkylCONR}^a\text{R}^b$ where R^a and R^b are as previously defined;

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R^2 represents C_{1-4} alkyl substituted by an optionally substituted aromatic heterocycle;

R^3 represents H, C_{1-6} alkyl or C_{2-6} alkylenyl;

R^4 represents H, C_{1-6} alkyl or phenyl

5 (optionally substituted by one or more of C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, halo, cyano, nitro, trifluoromethyl, trimethylsilyl, SR^C , SOR^C , SO_2R^C , OR^C , $NR^C R^d$, $NR^C COR^d$, $NR^C COOR^d$, $COOR^C$ or $CONR^C R^d$, where R^C and R^d each independently represent H, C_{1-6} alkyl, phenyl or
10 trifluoromethyl);

R^5 represents phenyl optionally substituted by one or more of C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, halo, cyano, nitro, trifluoromethyl, trimethylsilyl, SR^C , SOR^C , SO_2R^C , OR^C , $NR^C R^d$, $NR^C COR^d$, $NR^C COOR^d$, $COOR^C$ or $CONR^C R^d$,
15 where R^C and R^d are as above defined; and

q is 0, 1, 2 or 3.

2. A compound as claimed in claim 1 wherein
20 R^2 represents C_{1-4} alkyl substituted by an optionally substituted 5- or 6-membered aromatic heterocycle.

3. A compound as claimed in claim 2 wherein
25 R^2 represents C_{1-4} alkyl substituted by optionally substituted oxadiazolyl, imidazolyl, triazolyl or tetrazolyl.

4. A compound as claimed in any preceding claim wherein Q represents optionally substituted phenyl.

30 5. A compound as claimed in any of claims 1 to 3 wherein Q represents optionally substituted benzhydryl.

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6. A compound as claimed in any preceding claim wherein R^1 is H or C_{1-6} alkyl.

7. A compound as claimed in any preceding claim wherein R^4 is H or C_{1-6} alkyl.

8. A compound as claimed in any preceding claim wherein q is zero and R^5 is substituted phenyl.

9. A compound as claimed in any preceding claim wherein X and Y each represent H and Z represents O.

10. A compound as claimed in claim 1 selected from:

2-((3-amino-1,3,4-oxadiazol-5-yl)methylammonium)-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylpropane;

(2S)-2-((3-amino-1,3,4-oxadiazol-5-yl)methylammonium)-1-((3',5'-bis(trifluoromethyl)phenyl)methyloxy)-2-phenylethane;

3-[N-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenylethyl)aminomethyl]-1,2,4-triazole;

1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenyl-2-(N-(1,2,4-triazol-3-yl)methyl-N-methylamino)propane;

1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-2-[N-((3-thioxo-1,2,4-triazol-5-yl)methyl)-N-methylamino]-3,3-diphenylpropane;

5-[N-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenylethyl)-N-methylamino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;

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- 5-[(N-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenylethyl) ammonium)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- 5 5-[(N-(2-(((3-t-butyl,5-methyl)phenyl)methyloxy)-1-phenylethyl))-N-methylamino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- 10 5-[((N-(1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylprop-2-yl)-N-methyl) amino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- 15 5-[(N-(1-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-3,3-diphenylprop-2-yl) amino)methyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- 5-[(N-((2S)-2-(1-(3,5-dichlorophenyl)methyloxy))-2-phenyl) ethyl) aminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- (S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenyl) ethyl) aminomethyl]imidazolidine-2,4-dione;
- 20 (S)-3-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenyl) ethyl)-N-methylaminomethyl]-1,2,4-triazole;
- (S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenyl) ethyl)-N-ethylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- 25 (S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenyl) ethyl)-N-propylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- (R)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenyl) ethyl)-N-ethylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
- 30 (S)-3-[1-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methyloxy)-1-phenyl) ethyl)-N-ethylamino]ethyl]-1,2,4-triazole;

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- (S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]tetrazole;
(S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]-2-N-methyltetrazole;
5 (S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)aminomethyl]-1-N-methyltetrazole;
(S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]tetrazole;
10 5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-2-N-methyltetrazole;
(S)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-1-N-methyltetrazole;
15 (R)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]tetrazole;
(R)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-2-N-methyltetrazole;
20 (R)-5-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-1-N-methyltetrazole;
(S)-5-[2-[N-(1-(2-((3,5-bis(trifluoromethyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylamino]ethyl]tetrazole;
25 (S)-5-[N-(2-((3-chloro-5-methyl)phenyl)methoxy)-1-phenyl)ethyl)-N-methylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
(S)-5-[N-[1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl]-N-methylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;
30 (R)-5-[N-[1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl]-N-methylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;

- 60 -

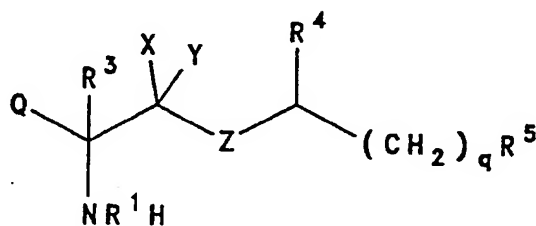
5-[N-[1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl]-N-ethylaminomethyl]-2,3-dihydro-4H-1,2,4-triazol-3-one;

5-[N-[1-((3,5-bis(trifluoromethyl)phenyl)methoxy)-3,3-diphenylprop-2-yl]-N-methylaminomethyl]-N-methyl-2,3-dihydro-4H-1,2,4-triazol-3-one;
and salts and prodrugs thereof.

11. A compound as claimed in any preceding claim for use in therapy.

12. A pharmaceutical composition comprising a compound as claimed in any one of claims 1 to 10 in association with a pharmaceutically acceptable carrier.

13. A process for the preparation of a compound as claimed in claim 1, which process comprises:
(A) reacting a compound of formula (II):

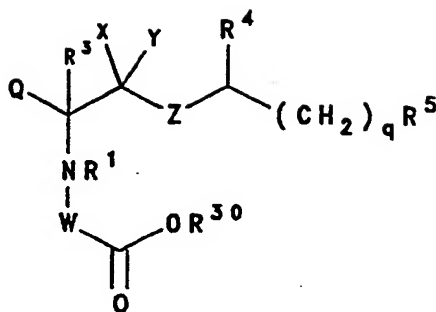


(II)

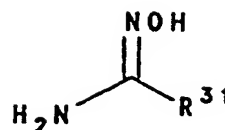
wherein Q, R¹, R³, R⁴, R⁵, q, X, Y and Z are as defined for formula (I), with a reagent suitable to introduce the group R²; or

(B) reacting a compound of formula (III) with a compound of formula (IV):

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(III)

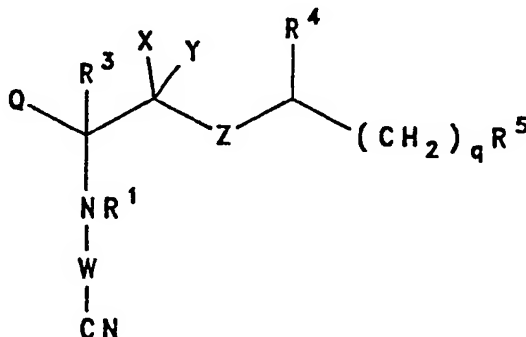


(IV)

wherein Q, R¹, R³, R⁴, q, R⁵, X, Y and Z are as defined for formula (I), W represents C₁₋₄alkylidene, R³⁰ represents an alkyl group and R³¹ represents H or a suitable substituent, in the presence of a base; or

15

(C) reacting a compound of formula (V):



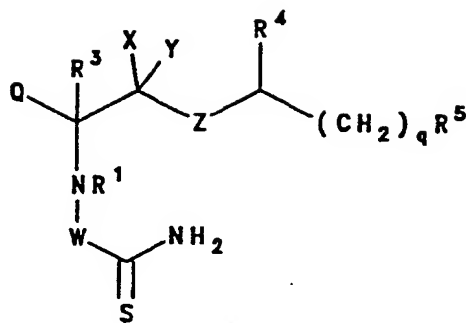
(V)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III), with an alkali metal azide; or

(D) reacting a compound of formula (VI):

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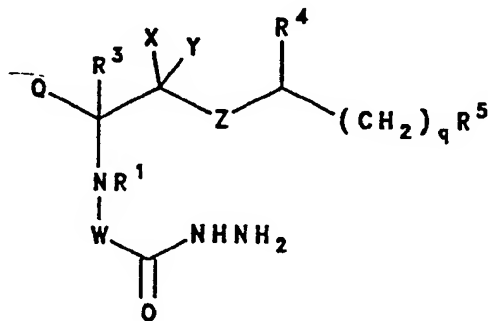


(VI)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III), with a compound of formula Hal-CH₂C(=O)R⁶⁰, where Hal represents halo and R⁶⁰ represents H or a suitable substituent; or

15

(E) reacting a compound of formula (VII):



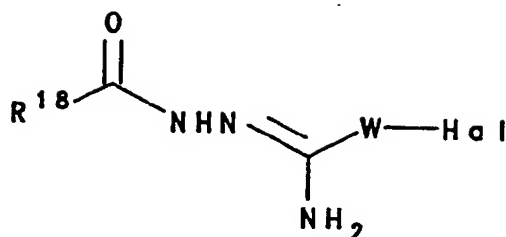
(VII)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III), with a compound of formula R⁶¹NCS, wherein R⁶¹ is H or a suitable substituent, in the presence of a base; or

30

(F) reacting a compound of formula (II) as previously defined with a compound of formula (VIII):

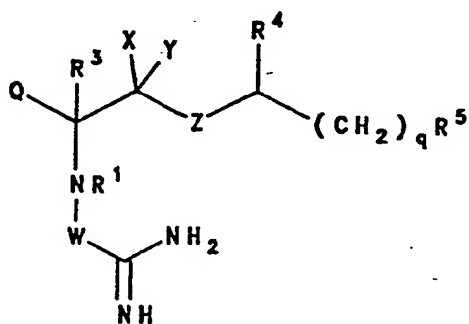
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(VIII)

10 wherein W and Hal are as previously defined and R^{18} is H or a group suitable as a substituent of the triazole ring, or convertible to such a group under the reaction conditions, in the presence of a base; or

15 (G) reacting a compound of formula (IX):



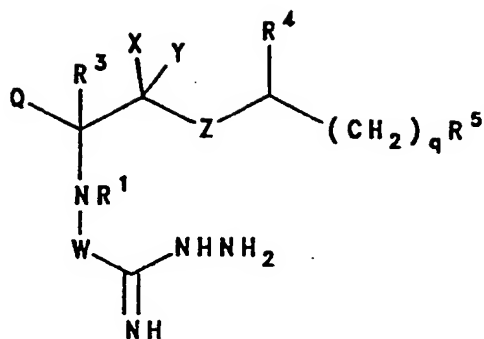
(IX)

25 wherein Q, R^1 , R^3 , R^4 , R^5 , q, X, Y, W and Z are as defined for formula (III), with a substituted or unsubstituted triazine; or

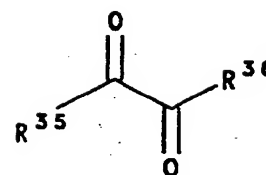
(H) reacting a compound of formula (X) with a compound of formula (XI):

30

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(X)



(XI)

wherein Q, R¹, R³, R⁴, R⁵, q, X, Y, W and Z are as defined for formula (III) and R³⁵ and R³⁶ each independently represent H or a suitable substituent.

15

14. A method for the treatment or prevention of a physiological disorder associated with an excess of tachykinins, which method comprises administration to a patient in need thereof of a tachykinin-reducing amount of a compound according to claim 1.

20

15. A method according to claim 14 for the treatment or prevention of pain or inflammation.

25

16. A method according to claim 14 for the treatment or prevention of migraine.

17. A method according to claim 14 for the treatment or prevention of arthritis.

30

18. The use of a compound as claimed in any one of claims 1 to 10 for the manufacture of a medicament for the treatment of a physiological disorder associated with an excess of tachykinins.

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19. The use of a compound as claimed in any one of claims 1 to 10 for the manufacture of a medicament for the treatment of pain or inflammation.

5

20. A process for preparing a composition as claimed in claim 12 which process comprises bringing a compound as claimed in any of claims 1 to 10 into association with a pharmaceutically acceptable carrier.

10

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 93/01072

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 C07D233/54; C07D257/04;	C07D233/76; C07D271/06;	C07D249/08; A61K31/41
C07D249/14		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	C07D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	EP,A,0 194 464 (RESEARCH CORPORATION) 17 September 1986 cited in the application * Formula 1 and page 2, lines 1 - 8 *	1-20
A	GB,A,2 054 588 (SOCIÉTÉ INDUSTRIELLE DE PRODUITS DE SYNTHÈSE) 18 February 1981 cited in the application see abstract	1-20
P,A	EP,A,0 522 808 (MERCK SHARP DOHME) 13 January 1993 see the whole document	1-20
A	WO,A,9 112 266 (FUJISAWA) 22 August 1991 see the whole document	1-20
-/-		
<p>¹⁰ Special categories of cited documents : ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
27 JULY 1993		30. 07. 93
International Searching Authority		Signature of Authorized Officer
EUROPEAN PATENT OFFICE		Bernd Kissler

Form PCT/ISA/210 (second edn) (January 1993)

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	EP,A,0 394 989 (FUJISAWA) 31 October 1990 see the whole document ----	1-20
A	DE,A,2 035 535 (CENTRE EUROPEEN DE RECHERCHES MAUVERNAY) 28 January 1971 see the whole document ----	1-20
A	EP,A,0 415 413 (WARNER-LAMBERT) 6 March 1991 see the whole document -----	1-20

Form PCT/ISA/210 (extra sheet) (January 1985)

INTERNATIONAL SEARCH REPORT

national application No.

PCT/GB93/01072

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
Although claims 14-17 are directed to a method of treatment of (diagnostic method practised on) the human/animal body, the search has been carried out and based on the alleged effects of the compound/compound.
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

./.
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/

The definition of the following substituent(s) is too general and/or encompasses too broad a range of totally different chemical groups, only partly supported by examples given in the descriptive part of the application:
X, Y, Z, q, R2

The number of theoretically conceivable compounds resulting from the combination of all claimed substituents of above list precludes a comprehensive search. Guided by the spirit of the application and the inventive concept as disclosed in the descriptive part of the present application the search has been limited to the following case(s):

Z=O, q=O, R4=H, e.g. phenylmethoxy-ethanes/propanes (other variables as defined in claim 1)

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

GB 9301072
SA 74858

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		AU-A- 5371186	21-08-86
		JP-A- 61200950	05-09-86
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		BE-A- 884212	08-01-81
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		WO-A- 9301169	21-01-93
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		CA-A- 2024300	01-03-91
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		JP-A- 3148247	25-06-91

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